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DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

RIN 0648-XC486

Taking of Marine Mammals Incidental to Specified Activities; U.S. Marine Corps  
Training Exercises at Air Station Cherry Point

AGENCY: National Marine Fisheries Service, National Oceanic and Atmospheric  
Administration (NOAA), Commerce.

ACTION: Notice; proposed incidental harassment authorization; receipt of application  
for letter of authorization; request for comments.

SUMMARY: We have received an application from the U.S. Marine Corps (Marine  
Corps) requesting an incidental harassment authorization (Authorization) to take marine  
mammals incidental to various training exercises at Marine Corps Air Station (MCAS)  
Cherry Point Range Complex, North Carolina for a period of one year.

The Marine Corps' activities are military readiness activities pursuant to the Marine  
Mammal Protection Act (MMPA), as amended by the National Defense Authorization  
Act (NDAA) for Fiscal Year 2004. Per the MMPA, we are requesting comments on our  
proposal to issue an authorization to the Marine Corps to incidentally harass by Level B  
harassment only, bottlenose dolphins (*Tursiops truncatus*), during the training exercises  
that would occur within the proposed effective period of May 20, 2013 through May 19,  
2014. We are also requesting comments on our intent to promulgate regulations  
governing the take of marine mammals over a 5-year period incidental to the activities  
described in this notice.

DATES: Comments and information must be received no later than [INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION WITH THE OFFICE OF THE FEDERAL REGISTER].

ADDRESSES: Comments on the application should be addressed to P. Michael Payne, Chief, Permits and Conservation Division, Office of Protected Resources, National Marine Fisheries Service, 1315 East-West Highway, Silver Spring, MD 20910-3225. The mailbox address for providing email comments is ITP.Cody@noaa.gov. Please include 0648-XC486 in the subject line. We are not responsible for e-mail comments sent to addresses other than the one provided here. Comments sent via e-mail, including all attachments, must not exceed a 25-megabyte file size.

Instructions: All submitted comments are a part of the public record and we would post to <http://www.nmfs.noaa.gov/pr/permits/incidental.htm#applications> without change. All Personal Identifying Information (for example, name, address, etc.) voluntarily submitted by the commenter may be publicly accessible. Do not submit confidential business information or otherwise sensitive or protected information.

To obtain an electronic copy of the application, write to the previously mentioned address, telephone the contact listed here (see FOR FURTHER INFORMATION CONTACT), or visit the internet at:  
<http://www.nmfs.noaa.gov/pr/permits/incidental.htm#applications>.

The following associated document is also available at the same internet address:  
The Marine Corps' Environmental Assessment (EA) titled, "Environmental Assessment MCAS Cherry Point Range Operations," for their federal action of supporting and conducting current and emerging training operations. Their EA evaluates the effects of

the proposed training operations on the human environment including impacts to marine mammals and their 2009 Finding of No Significant Impact (FONSI) for the activities.

This notice and the referenced document present detailed information on the scope of our federal action and resultant environmental impacts for purposes of the National Environmental Policy Act of 1969 (NEPA; 42 U.S.C. 4321 et seq.) (i.e., potential impacts to marine mammals from issuing the proposed Authorization including measures for mitigation, and monitoring). We solicit and would consider comments submitted in response to this notice when determining whether to prepare additional NEPA analysis. Documents cited in this notice may also be viewed, by appointment, during regular business hours, at the aforementioned address.

FOR FURTHER INFORMATION CONTACT: Jeannine Cody, Office of Protected Resources, NMFS, (301) 427-8401.

#### SUPPLEMENTARY INFORMATION:

##### Background

Section 101(a)(5)(D) of the Marine Mammal Protection Act of 1972, as amended (MMPA; 16 U.S.C. 1361 et seq.) directs the Secretary of Commerce to authorize, upon request, the incidental, but not intentional, taking of small numbers of marine mammals of a species or population stock, by United States citizens who engage in a specified activity (other than commercial fishing) within a specified geographical region if, after notice of a proposed authorization to the public for review and public comment: (1) we make certain findings; and (2) the taking is limited to harassment.

We shall grant authorization for the incidental taking of small numbers of marine mammals if we find that the taking will have a negligible impact on the species or

stock(s), and will not have an unmitigable adverse impact on the availability of the species or stock(s) for subsistence uses (where relevant). The authorization must set forth the permissible methods of taking; other means of effecting the least practicable adverse impact on the species or stock and its habitat; and requirements pertaining to the mitigation, monitoring and reporting of such taking. We have defined "negligible impact" in 50 CFR 216.103 as "...an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival."

Section 101(a)(5)(D) of the MMPA established an expedited process by which citizens of the United States can apply for an authorization to incidentally take small numbers of marine mammals by harassment. Section 101(a)(5)(D) of the MMPA establishes a 45-day time limit for our review of an application followed by a 30-day public notice and comment period on any proposed authorizations for the incidental harassment of small numbers of marine mammals. Within 45 days of the close of the public comment period, we must either issue or deny the authorization and must publish a notice in the Federal Register within 30 days of our determination to issue or deny the authorization.

The National Defense Authorization Act of 2004 (NDAA; (Public Law 108–136)) amended section 101(a)(5)(A) of the MMPA by removing the small numbers and specified geographic region provisions; revising the definition of harassment as it applies to a military readiness activity; and explicitly requiring that our determination of “least practicable adverse impact” include consideration of: (1) personnel safety; (2) the

practicality of implementation; and (3) impact on the effectiveness of the military readiness activity.

The NDAA's definition of harassment as it applies to a military readiness activity is:

(i) any act that injures or has the significant potential to injure a marine mammal or marine mammal stock in the wild [Level A Harassment]; or (ii) any act that disturbs or is likely to disturb a marine mammal or marine mammal stock in the wild by causing disruption of natural behavioral patterns, including, but not limited to, migration, surfacing, nursing, breeding, feeding, or sheltering, to a point where such behavioral patterns are abandoned or significantly altered [Level B Harassment].

#### Summary of Request

We received a request from the Marine Corps on January 28, 2013, requesting that we issue we issue an Incidental Harassment Authorization (Authorization) for the take, by Level B harassment only, of small numbers of Atlantic bottlenose dolphins (Tursiops truncatus) incidental to air-to-surface and surface-to-surface training exercises conducted around two bombing targets within southern Pamlico Sound, North Carolina, at MCAS Cherry Point. We received a complete and adequate application requesting Authorization on March 19, 2013.

To date, we have issued two, 1-year Authorizations to the Marine Corps for the conduct of the same activities from 2010 to 2012 (75 FR 72807, November 26, 2010; 77 FR January 3, 2012). This is the Marine Corps' third request for an Authorization. We intend to proceed to rulemaking after a final determination is made on whether or not to issue this Authorization. This document also serves as Notice of Receipt of a request for rulemaking and subsequent Letter of Authorization.

Project Purpose –The Marine Corps plan to conduct weapon delivery training at two bombing targets: Brant Island Target (BT-9) and Piney Island Bombing Range (BT-11). Training at BT-9 would involve air-to-surface (from aircraft to in-water targets) and surface-to-surface (from vessels to in-water targets) warfare training, including bombing, strafing, special (laser systems) weapons; surface fires using non-explosive and explosive ordnance; and mine laying exercises (inert). Training at BT-11 would involve air- to-surface exercises to provide training in the delivery of conventional (non-explosive) and special (laser systems) weapons. Surface-to-surface training by small military watercraft would also be executed here. The types of ordnances proposed for use at BT-9 and BT-11 include small arms, large arms, bombs, rockets, missiles, and pyrotechnics. All munitions used at BT-11 are inert, practice rounds. No live firing occurs at BT-11. Training for any activity may occur year-round. Active sonar is not a component of these specified training exercises; therefore, we have not included a discussion of marine mammal harassment from active sonar operations within this notice.

#### Description of the Specified Activity

The Marine Corps is requesting authorization to harass bottlenose dolphins from ammunition firing conducted at two bombing targets within MCAS Cherry Point. The authorization would be valid for a period of one year from the date of issuance. The bombing targets are located at the convergence of the Neuse River and Pamlico Sound, North Carolina.

BT-9 is a water-based target located approximately 52 kilometers (km) (32.3 miles (mi); 28 nautical miles (nm)) northeast of MCAS Cherry Point. The BT-9 target area ranges in depth from 1.2 to 6.1 meters (m) (3.9 to 20 feet (ft)), with the shallow areas

concentrated along the Brandt Island Shoal (which runs down the middle of the restricted area in a northwest to southeast orientation). The target itself consists of three ship hulls grounded on Brant Island Shoals, located approximately 4.8 km (3.0 mi) southeast of Goose Creek Island. Inert (non-explosive) ordnance up to 454 kilograms (kg) (1,000 pounds (lbs)) and live (explosive) ordnance up to 45.4 kg (100 lbs) trinitrotoluene (TNT) equivalent, including ordnance released during strafing, are authorized for use at this target range. The target is defined by a 6 statute-mile diameter prohibited area designated by the U.S. Army Corps of Engineers, Wilmington District (33 CFR 334.420). Non-military vessels are not permitted within the prohibited area, which is delineated by large signs located on pilings surrounding the perimeter of the BT. BT-9 also provides a mining exercise area; however, all mine exercises are simulation only and do not involve detonations. BT-9 standard operating procedures limit live ordnance deliveries to a maximum explosive weight of 100 lbs TNT equivalent. The USMC estimates that it could conduct up to approximately 1,554 aircraft-based and 322 vessel-based sorties, annually, at BT-9. The standard sortie consists of two aircraft per bombing run or an average of two and maximum of six vessels.

BT-11 is a 50.6 square kilometers (km<sup>2</sup>) (19.5 square miles (mi<sup>2</sup>)) complex of land- and water-based targets on Piney Island. The BT-11 target area ranges in depth from 0.3 m (1.0 ft) along the shoreline to 3.1 m (10.1 ft) in the center of Rattan Bay (BA, 2001). The in-water stationary targets of BT-11 consist of a barge and patrol (PT) boat located in roughly the center of Rattan Bay. The barge target is approximately 41.1 by 12.2 m (135 by 40 ft) in dimension. The PT boat is approximately 33.5 by 10.7 m (110 ft by 35 ft) in dimension. Water depths in the center of Rattan Bay are estimated as 2.4 to 3 m (8 to 10

ft) with bottom depths ranging from 0.3 to 1.5 m (1 to 5 ft) adjacent to the shoreline of Piney Island. A shallow ledge, with substrate expected to be hard-packed to hard bottom, surrounds Piney Island. No live firing occurs at BT-11; all munitions used are inert, non-explosive practice rounds. Only 36 percent of all munitions fired at BT-11 occur over water; the remaining munitions are fired to land based targets on Piney Island. The USMC estimates that it could conduct up to approximately 6,727 aircraft-based and 51 vessel-based sorties, annually, at BT-11.

All inert and live-fire exercises at MCAS Cherry Point ranges are conducted so that all ammunition and other ordnances strike and/or fall on the land or water based target or within the existing danger zones or water restricted areas. A danger zone is a defined water area that is closed to the public on an intermittent or full-time basis for use by military forces for hazardous operations such as target practice and ordnance firing. A water restricted area is a defined water area where public access is prohibited or limited in order to provide security for government property and/or to protect the public from the risks of injury or damage that could occur from the government's use of that area (33 CFR 334.2). Surface danger zones are designated areas of rocket firing, target practice, or other hazardous operations (33 CFR 334.420). The surface danger zone (prohibited area) for BT-9 is a 4.8 km (3.0 mi) radius centered on the south side of Brant Island Shoal. The surface danger zone for BT-11 is a 2.9 km (1.8 mi) radius centered on a barge target in Rattan Bay.

According to the application, the Marine Corps is requesting take of marine mammals incidental to specified activities at MCAS Cherry Point Range Complex, located within Pamlico Sound, North Carolina. These activities include gunnery; mine laying; bombing;



or rocket exercises and are classified into two categories here based on delivery method: (1) surface-to-surface gunnery and (2) air-to-surface bombing. Exercises may occur year round, day or night (approximately 15 percent of training occurs at night).

#### Surface-to-Surface Gunnery Exercises

Surface-to-surface fires are fires from boats at sea to targets at sea. These can be direct (targets are within sight) or indirect (targets are not within sight). Gunnery exercise employing only direct fire is the only category of surface-to-surface activity currently conducted within the MCAS Cherry Point bombing targets. An average of two and maximum of six small boats (7.3- 26.0 m; 24-85 ft), or fleet of boats, typically operated by Special Boat Team personnel, use a machine gun to attack and disable or destroy a surface target that simulates another ship, boat, swimmer, floating mine or near shore land targets. Vessels would travel between 0-20 knots (kts) (0-23 miles per hour (mph)) with an average of two vessels actually conducting surface-to-surface firing activities. Typical munitions would be 7.62 millimeter (mm) or .50 caliber (cal) machine guns; and/or 40 mm grenade machine guns. This exercise is usually a live-fire exercise, but at times blanks would be used so that the boat crews could practice their ship handling skills. The goal of training is to hit the targets; however, some munitions may bounce off the targets and land in the water or miss the target entirely. Additionally, the personnel would use G911 concussion hand grenades (inert and live); however, these are not aimed at targets, as the goal is to learn how to throw them into the water.

Table 1 includes the estimated amount of munitions expended at BT-9 and BT-11 in 2011 and 2012. Historically, boat sorties have been conducted at BT-9 and BT-11 year round with equal distribution of training effort throughout the seasons. Live fires

constitute approximately 90 percent of all surface-to-surface gunnery events. The majority of sorties originated and practiced at BT-9 as no live fire is conducted at BT-11. The Marine Corps has indicated a comparable number of sorties would occur throughout the IHA timeframe. There is no specific schedule associated with the use of ranges by the small boat teams. However, exercises tend to be scheduled for 5-day blocks with exercises at various times throughout that timeframe. There is no specific time of year or month training occurs as variables such as deployment status, range availability, and completion of crew specific training requirements influence schedules.

**Table 1. Aircraft and boat sorties, by mission type, conducted in 2011 and 2012.**

<b>Mission Type</b>	<b>BT-9</b>		<b>BT-11</b>	
	<b>2011</b>	<b>2012</b>	<b>2011</b>	<b>2012</b>
Air-to-Surface	1,554		4,251	
Surface-to-Surface	223	322	105	106
Total	1,777		4,356	

A number of different types of boats are used during surface-to-surface exercises depending on the unit using the boat and their mission and include versions of Small Unit River Craft, Combat Rubber Raiding Craft, Rigid Hull Inflatable Boats, Patrol Craft. They are inboard or outboard, diesel or gasoline engines with either propeller or water jet propulsion. Boat crews approach, at a maximum of 20 kts (23 mph), and engage targets simulating other boats, swimmers, floating mines, or near shore land targets with 7.62 mm or .50 cal machine guns; 40 mm grenade machine guns; or M3A2 concussion hand grenades (approximately 200, 800, 10, and 10 rounds respectively). Vessels typically travel in linear paths and do not operate erratically. Other vessels may be located within the BTs; however, these are support craft and do not participate in munitions expenditures. The purpose of the support craft is to remotely control High Speed

Maneuvering Surface Targets (HSMSTs) or to conduct maintenance on electronic equipment located in the towers at BT-9. Support craft are typically anchored or tied to marker pilings during HSMST operations or tied to equipment towers. When underway, vessels do not typically travel faster than 12-18 kts (13.8-20.7 mph) or in an erratic manner.

### Air-to-Surface

Air-to-surface training involves ordnance delivered from aircraft and aimed at targets on the water's surface or on land in the case of BT-11. We provide a description of the types of targets used at MCAS Cherry Point in the previous section. There are four types of air-to-surface activities conducted within the MCAS Cherry Point BTs: mine laying; bombing, gunnery, or rocket exercises which are carried out via fixed- or rotary-wing aircraft.

#### Mine Laying Exercises

Mine warfare includes the strategic, operational, and tactical use of mines and mine countermeasure measures. Mine warfare is divided into two basic subdivisions: (a) The laying of mines to degrade the enemy's capabilities to wage land, air, and maritime warfare, and (b) the countering of enemy-laid mines to permit friendly maneuver or use of selected land or sea areas (DoN, 2007). MCAS Cherry Point would only engage in mine laying exercises as described below in the waters around BT-9. No detonations of any mine device are involved with this training.

During mine laying, a fixed-wing or maritime patrol aircraft (P-3 or P-8) typically drops a series of about four inert mine shapes in an offensive or defensive pattern, making multiple passes along a pre-determined flight azimuth, and dropping one or more

shapes each time. Mine simulation shapes include MK76, MK80 series, and BDU practice bombs ranging from 25 to 2,000 pounds in weight. There is an attempt to fly undetected to the area where the mines are laid with either a low or high altitude tactic flight. The shapes are scored for accuracy as they enter the water and the aircrew is later debriefed on their performance. The training shapes are inert (no detonations occur) and expendable.

### Bombing Exercises

The purpose of bombing exercises is to train pilots in destroying or disabling enemy ships or boats. During training, fixed wing or rotary wing aircraft deliver bombs against surface maritime targets at BT-9 or BT-11, day or night, using either unguided or precision-guided munitions. Unguided munitions include MK-76 and BDU-45 inert training bombs, and MK-80 series of inert bombs (no cluster munitions authorized). Precision-guided munitions consist of laser-guided bombs (inert) and laser-guided training rounds (inert). Typically, two aircraft approach the target (principally BT-9) from an altitude of approximately 914 m (3,000 ft) up to 4,572 m (15,000 ft) and, when on an established range, the aircraft adhere to designated ingress and egress routes. Typical bomb release altitude is 914 m (3,000 ft) for unguided munitions or above 4,572 m (15,000 ft) and in excess of 1.8 km (1 nm) for precision-guided munitions. However, the lowest minimum altitude for ordnance delivery (inert bombs) would be 152 m (500 ft).

Onboard laser designators or laser designators from a support aircraft or ground support personnel are used to illuminate certified targets for use when using laser guided weapons. Due to target maintenance issues, live bombs have not been dropped at the BT-

9 targets for the past few years although these munitions are authorized for use. For the effective IHA timeframe, the Marine Corps would not use live bombs. Live rockets and grenades; however, have been expended at BT-9.

Air-to-surface bombing exercises have the potential to occur on a daily basis. The standard sortie consists of two aircraft per bombing run. The frequency of these exercises is dependent on squadron level training requirements, deployment status, and range availability; therefore, there is no set pattern or specific time of year or month when this training occurs. Normal operating hours for the range are 8 a.m. to 11 p.m., Monday through Friday; however, the range is available for use 365 days per year.

#### Gunnery Exercises

During gunnery training, fixed- and rotary-wing aircraft expend smaller munitions targeted at the bombing targets with the purpose of hitting them. However, some small arms may land in the water. Rotary wing exercises involve either CH-53, UH-1, CH-46, MV-22, or H-60 rotary-wing aircraft with mounted 7.62 mm or .50 cal machine guns. Each gunner expends approximately 800 rounds of 7.62 mm and 200 rounds of .50 cal ammunition in each exercise. These may be live or inert.

Fixed wing gunnery exercises involve the flight of two aircraft that begin to descend to the target from an altitude of approximately 914 m (3,000 ft) while still several miles away. Within a distance of 1,219 m (4,000 ft) from the target, each aircraft fires a burst of approximately 30 rounds before reaching an altitude of 305 m (1,000 ft), then breaks off and repositions for another strafing run until each aircraft expends its exercise ordnance allowance of approximately 250 rounds. In total, about 8-12 passes are made by each

aircraft per exercise. Typically these fixed wing exercise events involve an F/A-18 and AH-1 with Vulcan M61A1/A2, 20 mm cannon; AV-8 with GAU-12, 25 mm cannon.

#### Rocket Exercises

Rocket exercises are carried out similar to bombing exercises. Fixed- and rotary-wing aircraft crews launch rockets at surface maritime targets, day and night, to train for destroying or disabling enemy ships or boats. These operations employ 2.75-inch and 5-inch rockets. Generally, the average number of rockets delivered per sortie is approximately 14. As with the bombing exercise, there is no set level or pattern of amount of sorties conducted.

#### Munitions Descriptions

We refer the reader to Tables 2 and 3 for a complete list of the ordnance authorized for use at BT-9 and BT-11, respectively. There are several varieties and net explosive weights (for live munition used at BT-9) can vary according to the variety. All practice bombs are inert and used to simulate the same ballistic properties of service type bombs. They are manufactured as either solid cast metal bodies or thin sheet metal containers. Since practice bombs contain no explosive filler, a practice bomb signal cartridge (smoke) is used for visual observation of weapon target impact. Practice bombs provide a low cost training device for pilot and ground handling crews. Due to the relatively small amount of explosive material in practice bombs (small signal charge), the availability of ranges for training is greatly increased.

When a high explosive detonates, it is converted almost instantly into a gas at very high pressure and temperature. Under the pressure of the gases thus generated, the weapon case expands and breaks into fragments. The air surrounding the casing is

compressed and shock (blast) wave is transmitted into it. Typical initial values for a high-explosive weapon are 200 kilobars of pressure (1 bar = 1 atmosphere) and 5,000 degrees Celsius (9,032 degrees Fahrenheit). There are five types of explosive sources used at BT-9: 2.75-inch Rocket High Explosives, 5-inch Rocket High Explosives, 30 mm High Explosives, 40 mm High Explosives, and G911 grenades. No live munitions are used at BT-11.

**Table 2** Description of munitions used at BT-9.

Ordnance	Description	Net Explosive Weight
MK-76 Practice Bomb (inert)	25-pound teardrop-shaped cast metal bomb, with a bore tube for installation of a signal cartridge	(of signal cartridge) varies, maximum 0.083800 lbs
BDU-33 Practice Bomb (inert)	Air Force MK 76 practice bomb	same as above
BDU-48 Practice Bomb (inert)	10-pound metal cylindrical bomb body with a bore tube for installation of a signal cartridge	same as above
BDU-45 Practice Bomb (inert)	500-pound metal bomb either sand or water filled. Two signal cartridges.	(of signal cartridges, total 0.1676 lbs.
BDU-50 Practice Bomb (inert)	500-pound metal bomb either sand or water filled. Two signal cartridges.	same as above
MK-81 Practice Bomb (inert)	250-pound bomb	0
MK-82 Practice Bomb (inert)	500-pound bomb	0
MK-83 Practice Bomb (inert)	1,000-pound bomb configured like BDU 45	0.1676 lbs.
MK-84 Practice Bomb (inert) (special exception use only)	2,000-pound bomb configured like BDU 45	0.1676 lbs.
2.75-inch (inert)	Unguided 2.75 inch diameter rocket	0
5-inch Zuni (inert)	Unguided 5 inch diameter rocket	0
5-inch Zuni (live)	Unguided 5-inch diameter rocket	15 lbs.
2.75wp (inert)	2.75 – inch rocket containing white phosphorous	0
2.75HE	High Explosive, 2.75 inch rocket	4.8 lbs.
0.50 cal (inert) 7.62 mm (inert) 20 mm (inert) 25mm (inert) 30 mm (inert) 40 mm (inert)	Machine gun rounds	0
25 mm HE (live)	High Explosive Incendiary, Live machine gun rounds	0.269 lbs
Self Protection Flare	Aerial flare	0
Chaff	18-pound chaff canister	0
LUU-2	30-pound high intensity illumination flare	0
Laser Guided Training Round (LGTR) (inert)	89-pound inert training bomblet	0

**Table 3** Description of munitions used at BT-11.

Ordnance	Description
MK76 Practice Bomb	25-pound teardrop-shaped cast metal bomb body, with a bore tube for installation of a signal cartridge
BDU 33 Practice Bomb	Air Force designation for MK 76 practice bomb
BDU 48 Practice Bomb	10-pound metal cylindrical bomb body with a bore tube for installation of a signal cartridge
BDU45 Practice Bomb	500-pound metal bomb body either sand or water filled. Configured with either low drag conical tail fins or high drag tail fins for retarded weapons delivery. Two signal cartridges installed
MK 81 Practice Bomb	250-pound inert bomb
MK 82 Practice Bomb	500-pound inert bomb
2.75-inch	Unguided 2.75 inch diameter rocket
5-inch Zuni	5 inch diameter rocket
WP-2.75-inch	White phosphorous 7-pound rocket
0.50 cal 7.62 mm 5.56 mm 20 mm 30 mm 40 mm	Inert machine gun rounds
TOW	Wire guided 56-pound anti-tank missile
Self Protection Flare	Aerial flare
SMD SAMS	1.5-pound smoking flare
LUU-2	30-pound high-intensity illumination flare
Laser Guided Training Round (LGTR)	89-pound inert training bomblet

The amounts of all ordnance to be expended at BT-9 and BT-11 (both surface-to-surface and air-to-surface) are 1,225,815 and 1,254,684 rounds, respectively (see Table 4 and 5).

**Table 4** Amount of live and inert munitions that would be expended at BT-9, annually.

Proposed Munitions <sup>1</sup>	Proposed Total No. of Rounds	Proposed Number of Explosive Rounds Having an Impact on the Water	Net Explosive Weight (lb)
Small Arms Rounds Excluding .50 cal	525,610	N/A	N/A
.50 Cal	568,515	N/A	N/A
Large Arms Rounds – Live	5,000	40mm HE: 5,000	0.1199
Large Arms Rounds – Inert	117,051	N/A	N/A
Rockets – Live	48 20	2.75" Rocket: 48 5" Rocket: 20	4.8 15.0
Rockets – Inert	876	N/A	N/A
Bombs and Grenades – Live	0	G911 Grenade: N/A	0.5
Bombs and Grenades – Inert	4,199	N/A	N/A
Pyrotechnics	4,496	N/A	N/A
Total	1,225,815		N/A

<sup>1</sup> Munitions may be expended from aircraft or small boats.



**Table 5** Amount of inert munitions that would be expended at BT-11.

<b>Proposed Munitions<sup>1</sup></b>	<b>Proposed Total No. of Rounds</b>
Small Arms Rounds Excluding .50 Cal	610,957
.50 Cal	366,775
Large Arms Rounds	240,334
Rockets	5,592
Bombs and Grenades	22,114
Pyrotechnics	8,912
Total	1,254,684

<sup>1</sup>Munitions may be expended from aircraft or small boats.

### Description of Marine Mammals in the Area of the Specified Activity

Forty marine mammal species occur within the nearshore and offshore waters of North Carolina; however, the majority of these species are solely oceanic in distribution. Only one marine mammal species, the bottlenose dolphin, has been repeatedly sighted in Pamlico Sound, while an additional species, the endangered West Indian manatee (Trichechus manatus), has been sighted rarely (Lefebvre et al, 2001; DoN 2003). The U.S. Fish and Wildlife Service oversees management of the manatee; therefore, we would not include a proposed authorization to harass manatees and we will not discuss this species further in this notice.

No sightings of the endangered North Atlantic right whale (Eubalaena glacialis) or other large whales have been observed within Pamlico Sound or in vicinity of the bombing targets (Kenney, 2006). No suitable habitat exists for these species in the shallow Pamlico Sound or bombing target vicinity; therefore, whales would not be affected by the specified activities. Thus, we will not discuss them further in this notice. Other dolphins, such as Atlantic spotted (Stenella frontalis) and common dolphins (Delphinus delphis), are oceanic in distribution and do not venture into the shallow, brackish waters of southern Pamlico Sound.

The specified activity has the potential to affect only one marine mammal species under our jurisdiction: the bottlenose dolphin. We refer the public to Waring et al. (2011)

for general information on this species which is presented below this section. The publication is available at <http://www.nmfs.noaa.gov/pr/pdfs/sars/ao2011.pdf> . We present a summary of information on the species below this section.

### Bottlenose Dolphin

California sea lions are not listed as threatened or endangered under the Endangered Species Act (ESA; 16 U.S.C. 1531 et seq.), however, they are categorized as depleted (and thus strategic) under the MMPA.

Four out of the seven designated coastal stocks for bottlenose dolphins may occur in North Carolina waters at some part of the year: the Northern Migratory stock (NM; winter); the Southern Migratory stock (SM; winter); the Northern North Carolina Estuarine stock (NNCE; resident, year round); and the more recently identified Southern North Carolina Estuarine stock (SNCE; resident, year round).

Dolphins encountered at the BTs likely belong to the NNCE and SNCE stock; however, this may not always be the case. NMFS' 2011 stock assessment report provides further detail on stock delineation.

NMFS provides abundance estimates for the four aforementioned migratory and resident coastal stocks in its 2011 stock assessment report. The best available abundance estimate for the NNCE stock is the combined abundance from estuarine (Read et al., 2003) and coastal (aerial survey data dating from 2002) waters. This combined estimate is 1,387 (Waring et al., 2011). Similarly, the best available abundance estimate for the SNCE stock is the combined abundance from estuarine and coastal waters. This combined estimate is 2,454 (Waring et al., 2011). The best abundance estimate for the NM stock, resulting from 2002 aerial surveys, is 9,604 (Waring et al., 2011). Using the

same information, the resulting best abundance estimate for the SM stock is 12,482 (Waring et al., 2011).

From July 2004 through April 2006, the Services Southeast Fisheries Science Center conducted 41 aerial surveys to document the seasonal distribution and estimated density of sea turtles and dolphins within Core Sound and portions of Pamlico Sound, and coastal waters extending one mile offshore (Goodman et al., 2007). Pamlico Sound was divided into two survey areas: western (encompassing BT-9 and BT-11) and eastern (including Core Sound and the eastern portion of restricted air space R-5306). In total, 281 dolphins were sighted in the western range. To account for animals likely missed during sightings (i.e., those below the surface), Goodman et al. (2007) estimate that, in reality, 415 dolphins were present. Densities for bottlenose dolphins in the western part of Pamlico Sound were calculated to be 0.0272 per square kilometer (km<sup>2</sup>) in winter and 0.2158 per km<sup>2</sup> in autumn. Dolphins were sighted throughout the entire range when mean sea surface temperature was 7.60° C to 30.82° C (45.6 to 87.5° F), with fewer dolphins sighted as water temperatures increased. Like in Mayer (2003), dolphins were found in higher numbers around BT-11, a range where no live firing occurs.

In 2000, Duke University Marine Lab (DUML), conducted a boat-based mark-recapture survey throughout the estuaries, bays and sounds of North Carolina (Read et al., 2003). This summer survey yielded a dolphin density of 0.183/ km<sup>2</sup> (0.071 mi<sup>2</sup>) based on an estimate of 919 dolphins for the northern inshore waters divided by an estimated 5,015 km<sup>2</sup> (1,936 mi<sup>2</sup>) survey area. Additionally, from July 2002- June 2003, the USMC supported DUML to conduct dolphin surveys specifically in and around BT-9 and BT-11. During these surveys, one sighting in the restricted area surrounding BT-9 and two

sightings in proximity to BT-11 were observed, as well as seven sightings in waters adjacent to the BTs. In total, 276 bottlenose dolphins were sighted ranging in group size from two to 70 animals with mean dolphin density in BT-11 more than twice as large as the density of any of the other areas; however, the daily densities were not significantly different (Maher, 2003). Estimated dolphin density at BT-9 and BT-11 based on these surveys were calculated to be 0.11 dolphins/km<sup>2</sup>, and 1.23 dolphins/km<sup>2</sup>, respectively, based on boat surveys conducted from July 2002 through June 2003 (excluding April, May, Sept. and Jan.). However, the Marine Corps choose to estimate take of dolphins based on the higher density reported from the summer 2000 surveys (0.183/ km<sup>2</sup>). Although the aerial surveys were conducted year round and therefore provide for seasonal density estimates, the average year-round density from the aerial surveys is 0.0936, lower than the 0.183/ km<sup>2</sup> density chosen to calculate take for purposes of this MMPA authorization. Additionally, Goodman et al. (2007) acknowledged that boat based density estimates may be more accurate than the uncorrected estimates derived from the aerial surveys.

In Pamlico Sound, bottlenose dolphins concentrate in shallow water habitats along shorelines, and few, if any, individuals are present in the central portions of the sounds (Gannon, 2003; Read et al., 2003a, 2003b). The dolphins utilize shallow habitats, such as tributary creeks and the edges of the Neuse River, where the bottom depth is less than 3.5 m (Gannon, 2003). Fine-scale distribution of dolphins seems to relate to the presence of topography or vertical structure, such as the steeply-sloping bottom near the shore and oyster reefs, which may be used to facilitate prey capture (Gannon, 2003). Results of a passive acoustic monitoring effort conducted from 2006-2007 by Duke University

researchers validated this information. Vocalizations of dolphins in the BT-11 vicinity were higher in August and September than vocalization detection at BT-9, an open water area (Read et al., 2007). Additionally, detected vocalizations of dolphins were more frequent at night for the BT-9 area and during early morning hours at BT-11.

Unlike migrating whales which display strong temporal foraging and mating/birthing periods, many bottlenose dolphins in Pamlico Sound are residents and mate year round. However, dolphins in the southeast U.S. do display some reproductive seasonality. Based on neonate stranding records, sighting data, and births by known females, the populations of dolphins that frequent the North Carolina estuarine waters have calving peaks in spring but calving continues throughout the summer and is followed by a smaller number of fall births (Thayer et al., 2003).

Bottlenose dolphins can typically hear within a broad frequency range of 0.04 to 160 kiloHertz (kHz) (Au, 1993; Turl, 1993). Electrophysiological experiments suggest that the bottlenose dolphin brain has a dual analysis system: one specialized for ultrasonic clicks and another for lower-frequency sounds, such as whistles (Ridgway, 2000). Scientists have reported a range of highest sensitivity between 25 and 70 kHz, with peaks in sensitivity at 25 and 50 kHz (Nachtigall et al., 2000). Recent research on the same individuals indicates that auditory thresholds obtained by electrophysiological methods correlate well with those obtained in behavior studies, except at some lower (10 kHz) and higher (80 and 100 kHz) frequencies (Finneran and Houser, 2006).

Sounds emitted by bottlenose dolphins have been classified into two broad categories: pulsed sounds (including clicks and burst-pulses) and narrow-band continuous sounds (whistles), which usually are frequency modulated. Clicks have a dominant frequency

range of 110 to 130 kHz and a source level of 218 to 228 decibels (dB) re: 1  $\mu$ Pa (peak-to-peak) (Au, 1993) and 3.4 to 14.5 kHz at 125 to 173 dB re 1  $\mu$ Pa (peak-to-peak) (Ketten, 1998). Whistles are primarily associated with communication and can serve to identify specific individuals (i.e., signature whistles) (Caldwell and Caldwell, 1965; Janik et al., 2006). Up to 52 percent of whistles produced by bottlenose dolphin groups with mother-calf pairs can be classified as signature whistles (Cook et al., 2004). Sound production is also influenced by group type (single or multiple individuals), habitat, and behavior (Nowacek, 2005). Bray calls (low-frequency vocalizations; majority of energy below 4 kHz), for example, are used when capturing fish, specifically sea trout (*Salmo trutta*) and Atlantic salmon (*Salmo salar*), in some regions (i.e., Moray Firth, Scotland) (Janik, 2000). Additionally, whistle production has been observed to increase while feeding (Acevedo-Gutiérrez and Stienessen, 2004; Cook et al., 2004).

#### Potential Effects on Marine Mammals

As mentioned previously, with respect to military readiness activities, Section 3(18)(B) of the MMPA defines “harassment” as: (i) Any act that injures or has the significant potential to injure a marine mammal or marine mammal stock in the wild [Level A Harassment]; or (ii) any act that disturbs or is likely to disturb a marine mammal or marine mammal stock in the wild by causing disruption of natural behavioral patterns, including, but not limited to, migration, surfacing, nursing, breeding, feeding, or sheltering, to a point where such behavioral patterns are abandoned or significantly altered [Level B Harassment].

The Marine Corps concluded that Level B harassment to marine mammals may occur incidental to munitions firing noise and pressure at the bombing targets. These military

readiness activities would result in increased noise levels, explosions, and munitions debris within bottlenose dolphin habitat. In addition, we also considered the potential for harassment from vessel and aircraft operation. Our analysis of potential impacts from these factors, including consideration of the Marine Corps' analysis in its application, is outlined in the following sections.

### Anthropogenic Sound

Marine mammals respond to various types of anthropogenic sounds introduced in the ocean environment. Responses are highly variable and depend on a suite of internal and external factors which in turn results in varying degrees of significance (NRC, 2003; Southall et al., 2007). Internal factors include: (1) individual hearing sensitivity, activity pattern, and motivational and behavioral state (e.g., feeding, traveling) at the time it receives the stimulus; (2) past exposure of the animal to the noise, which may lead to habituation or sensitization; (3) individual noise tolerance; and (4) demographic factors such as age, sex, and presence of dependent offspring. External factors include: (1) non-acoustic characteristics of the sound source (e.g., if it is moving or stationary); (2) environmental variables (e.g., substrate) which influence sound transmission; and (3) habitat characteristics and location (e.g., open ocean vs. confined area). To determine whether an animal perceives the sound, the received level, frequency, and duration of the sound are compared to ambient noise levels and the species' hearing sensitivity range. That is, if the frequency of an introduced sound is outside of the species' frequency hearing range, it cannot be heard. Similarly, if the frequency is on the upper or lower end of the species hearing range, the sound must be louder in order to be heard.

Marine mammal responses to anthropogenic noise are typically subtle and can include visible and acoustic reactions such as avoidance, altered dive patterns and cessation of pre-exposure activities and vocalization reactions such as increasing or decreasing call rates or shifting call frequency. Responses can also be unobservable, such as stress hormone production and auditory trauma or fatigue. It is not always known how these behavioral and physiological responses relate to significant effects (e.g., long-term effects or individual/ population consequences); however, individuals and populations can be monitored to provide some insight into the consequences of exposing marine mammals to noise. For example, Haviland-Howell et al. (2007) compared sighting rates of bottlenose dolphins within the Wilmington, NC stretch of the Atlantic Intracoastal Waterway (ICW) on weekends, when recreational vessel traffic was high, to weekdays, when vessel traffic was relatively minimal. The authors found that dolphins were less often sighted in the ICW during times of increased boat traffic (i.e., on weekends) and theorized that because vessel noise falls within the frequencies of dolphin communication whistles and primary energy of most fish vocalizations, the continuous vessel traffic along that stretch of the ICW could result in social and foraging impacts. However, the extent to which these impacts affect individual health and population structure is unknown.

A full assessment of marine mammal responses and disturbances when exposed to anthropogenic sound can be found in our proposed rulemaking for the Navy Cherry Point Range Complex (74 FR 11057, March 16, 2009). That rulemaking was made final on June 15, 2009 (74 FR 28370). In summary, sound exposure may result in physiological impacts, stress responses, and behavioral responses which could affect proximate or



ultimate life functions. Proximate life history functions are the functions that the animal is engaged in at the time of acoustic exposure. The ultimate life functions are those that enable an animal to contribute to the population (or stock, or species, etc.).

#### I. Physiology-Hearing Threshold Shift

In mammals, high-intensity sound may rupture the eardrum, damage the small bones in the middle ear, or over stimulate the electromechanical hair cells that convert the fluid motions caused by sound into neural impulses that are sent to the brain. Lower level exposures may cause a loss of hearing sensitivity, termed a threshold shift (TS) (Miller, 1974). Incidence of TS may be either permanent, referred to as permanent threshold shift (PTS), or temporary, referred to as temporary threshold shift (TTS). The amplitude, duration, frequency, and temporal pattern, and energy distribution of sound exposure all affect the amount of associated TS and the frequency range in which it occurs. As amplitude and duration of sound exposure increase, generally, so does the amount of TS and recovery time. Human non-impulsive noise exposure guidelines are based on exposures of equal energy (the same SEL) producing equal amounts of hearing impairment regardless of how the sound energy is distributed in time (NIOSH 1998). Until recently, previous marine mammal TTS studies have also generally supported this equal energy relationship (Southall et al., 2007). Three newer studies, two by Mooney et al. (2009a, 2009b) on a single bottlenose dolphin either exposed to playbacks of Navy MFAS or octave-band noise (4–8 kHz) and one by Kastak et al. (2007) on a single California sea lion exposed to airborne octave-band noise (centered at 2.5 kHz), concluded that for all noise exposure situations the equal energy relationship may not be the best indicator to predict TTS onset levels. Generally, with sound exposures of equal

energy, those that were quieter (lower sound pressure level [SPL]) with longer duration were found to induce TTS onset more than those of louder (higher SPL) and shorter duration (more similar to noise from AS Cherry Point exercises). For intermittent sounds, less TS will occur than from a continuous exposure with the same energy (some recovery will occur between exposures) (Kryter et al., 1966; Ward, 1997). Additionally, though TTS is temporary, very prolonged exposure to sound strong enough to elicit TTS, or shorter-term exposure to sound levels well above the TTS threshold, can cause PTS, at least in terrestrial mammals (Kryter, 1985). However, these studies highlight the inherent complexity of predicting TTS onset in marine mammals, as well as the importance of considering exposure duration when assessing potential impacts.

PTS consists of non-recoverable physical damage to the sound receptors in the ear, which can include total or partial deafness, or an impaired ability to hear sounds in specific frequency ranges; PTS is considered Level A harassment. TTS is recoverable and is considered to result from temporary, non-injurious impacts to hearing-related tissues; TTS is considered Level B harassment.

#### Permanent Threshold Shift

Auditory trauma represents direct mechanical injury to hearing related structures, including tympanic membrane rupture, disarticulation of the middle ear ossicles, and trauma to the inner ear structures such as the organ of Corti and the associated hair cells. Auditory trauma is irreversible and considered to be an injury that could result in PTS. PTS results from exposure to intense sounds that cause a permanent loss of inner or outer cochlear hair cells or exceed the elastic limits of certain tissues and membranes in the middle and inner ears and result in changes in the chemical composition of the inner ear

fluids. In some cases, there can be total or partial deafness across all frequencies, whereas in other cases, the animal has an impaired ability to hear sounds in specific frequency ranges. There is no empirical data for onset of PTS in any marine mammal, and therefore, PTS- onset must be estimated from TTS-onset measurements and from the rate of TTS growth with increasing exposure levels above the level eliciting TTS-onset. PTS is presumed to be likely if the hearing threshold is reduced by  $\geq 40$  dB (i.e., 40 dB of TTS). Relationships between TTS and PTS thresholds have not been studied in marine mammals, but are assumed to be similar to those in humans and other terrestrial mammals.

#### Temporary Threshold Shift

TTS is the mildest form of hearing impairment that can occur during exposure to a loud sound (Kryter, 1985). Southall et al. (2007) indicate that although PTS is a tissue injury, TTS is not because the reduced hearing sensitivity following exposure to intense sound results primarily from fatigue, not loss, of cochlear hair cells and supporting structures and is reversible. Accordingly, NMFS classifies TTS as Level B Harassment, not Level A Harassment (injury); however, NMFS does not consider the onset of TTS to be the lowest level at which Level B Harassment may occur (see III. Behavior section below this section).

Southall et al. (2007) considers a 6 dB TTS (i.e., baseline hearing thresholds are elevated by 6 dB) sufficient to be recognized as an unequivocal deviation and thus a sufficient definition of TTS onset. TTS in bottlenose dolphin hearing have been experimentally induced. For example, Finneran et al. (2002) exposed a trained captive bottlenose dolphin to a seismic watergun simulator with a single acoustic pulse. No TTS

was observed in the dolphin at the highest exposure condition (peak: 207 kPa [30psi]; peak-to-peak: 228 dB re: 1 microPa; SEL: 188 dB re 1 microPa<sup>2</sup>-s). Schludt et al. (2000) demonstrated temporary shifts in masked hearing thresholds in five bottlenose dolphins occurring generally between 192 and 201 dB rms (192 and 201 dB SEL) after exposure to intense, non-pulse, 1-s tones at , 3kHz, 10kHz, and 20 kHz. TTS onset occurred at mean sound exposure level of 195 dB rms (195 dB SEL). At 0.4 kHz, no subjects exhibited threshold shifts after SPL exposures of 193dB re: 1 microPa (192 dB re: 1 microPa<sup>2</sup>-s). In the same study, at 75 kHz, one dolphin exhibited a TTS after exposure at 182 dB SPL re: 1 microPa but not at higher exposure levels. Another dolphin experienced no threshold shift after exposure to maximum SPL levels of 193 dB re: 1 microPa at the same frequency. Frequencies of explosives used at MCAS Cherry Point range from 1-25 kHz; the range where dolphin TTS onset occurred at 195 dB rms in the Schludt et al. (2000) study.

Preliminary research indicates that TTS and recovery after noise exposure are frequency dependent and that an inverse relationship exists between exposure time and sound pressure level associated with exposure (Mooney et al., 2005; Mooney, 2006). For example, Nachtigall et al. (2003) measured TTS in a bottlenose dolphin and found an average 11 dB shift following a 30 minute net exposure to OBN at a 7.5 kHz center frequency (max SPL of 179 dB re: 1 microPa; SEL: 212- 214 dB re:1 microPa<sup>2</sup>-s). No TTS was observed after exposure to the same duration and frequency noise with maximum SPLs of 165 and 171 dB re:1 microPa. After 50 minutes of exposure to the same 7.5 kHz frequency OBN, Natchigall et al. (2004) measured a 4 -8 dB shift (max SPL: 160dB re 1microPa; SEL: 193-195 dB re:1 microPa<sup>2</sup>-s). Finneran et al. (2005)

concluded that a sound exposure level of 195 dB re 1  $\mu\text{Pa}^2\text{-s}$  is a reasonable threshold for the onset of TTS in bottlenose dolphins exposed to mid-frequency tones.

## II. Stress Response

An acoustic source is considered a potential stressor if, by its action on the animal, via auditory or non-auditory means, it may produce a stress response in the animal. Here, the stress response will refer to an increase in energetic expenditure that results from exposure to the stressor and which is predominantly characterized by either the stimulation of the sympathetic nervous system (SNS) or the hypothalamic-pituitary-adrenal (HPA) axis (Reeder and Kramer, 2005). The SNS response to a stressor is immediate and acute and is characterized by the release of the catecholamine neurohormones norepinephrine and epinephrine (i.e., adrenaline). These hormones produce elevations in the heart and respiration rate, increase awareness, and increase the availability of glucose and lipids for energy. The HPA response is ultimately defined by increases in the secretion of the glucocorticoid steroid hormones, predominantly cortisol in mammals. The presence and magnitude of a stress response in an animal depends on a number of factors. These include the animal's life history stage (e.g., neonate, juvenile, adult), the environmental conditions, reproductive or developmental state, and experience with the stressor. Not only will these factors be subject to individual variation, but they will also vary within an individual over time. The stress response may or may not result in a behavioral change, depending on the characteristics of the exposed animal.

However, provided a stress response occurs, we assume that some contribution is made to the animal's allostatic load. Any immediate effect of exposure that produces an injury is assumed to also produce a stress response and contribute to the allostatic load. Allostasis

is the ability of an animal to maintain stability through change by adjusting its physiology in response to both predictable and unpredictable events (McEwen and Wingfield, 2003). If the acoustic source does not produce tissue effects, is not perceived by the animal, or does not produce a stress response by any other means, we assume that the exposure does not contribute to the allostatic load. Additionally, without a stress response or auditory masking, it is assumed that there can be no behavioral change.

### III. Behavior

Changes in marine mammal behavior in response to anthropogenic noise may include altered travel directions, increased swimming speeds, changes in dive, surfacing, respiration and feeding patterns, and changes in vocalizations. As described above, lower level physiological stress responses could also co-occur with altered behavior; however, stress responses are more difficult to detect and fewer data exist relative to specific received levels of sound.

#### Acoustic Masking

Marine mammals use acoustic signals for a variety of purposes, which differ among species, but include communication between individuals, navigation, foraging, reproduction, and learning about their environment (Erbe and Farmer, 2000; Tyack, 2000). Masking, or auditory interference, generally occurs when sounds in the environment are louder than, and of a similar frequency as, auditory signals an animal is trying to receive. Masking is a phenomenon that affects animals that are trying to receive acoustic information about their environment, including sounds from other members of their species, predators, prey, and sounds that allow them to orient in their environment. Masking these acoustic signals can disturb the behavior of

individual animals, groups of animals, or entire populations

Southall et al. (2007) defines auditory masking as the partial or complete reduction in the audibility of signals due to the presence of interfering noise with the degree of masking depending on the spectral, temporal, and spatial relationships between signals and masking noise, as well as the respective received levels. Masking of sender communication space can be considered as the amount of change in a sender's communication space caused by the presence of other sounds, relative to a pre-industrial ambient noise condition (Clark et al., 2009). Unlike auditory fatigue, which always results in a stress response because the sensory tissues are being stimulated beyond their normal physiological range, masking may or may not result in a stress response, depending on the degree and duration of the masking effect. Masking may also result in a unique circumstance where an animal's ability to detect other sounds is compromised without the animal's knowledge. This could conceivably result in sensory impairment and subsequent behavior change; in this case, the change in behavior is the lack of a response that would normally be made if sensory impairment did not occur. For this reason, masking also may lead directly to behavior change without first causing a stress response. Projecting noise into the marine environment which causes acoustic masking is considered Level B harassment as it can disrupt natural behavioral patterns by interrupting or limiting the marine mammal's receipt or transmittal of important information or environmental cues. To compensate for masking, marine mammals, including bottlenose dolphins, are known to increase their levels of vocalization as a function of background noise by increasing call repetition and amplitude, shifting calls

higher frequencies, and/or changing the structure of call content (Lesage et al., 1999; Scheifele et al., 2005; McIwem, 2006).

While it may occur temporarily, we do not expect auditory masking to result in detrimental impacts to an individual's or population's survival, fitness, or reproductive success. Dolphins are not confined to the BT ranges; allowing for movement out of area to avoid masking impacts. The Marine Corps would also conduct visual sweeps of the area before any training exercise and implement training delay mitigation measures if a dolphin is sighted within designated zones (see Proposed Mitigation Measures section). As discussed previously, the Marine Corps has been working with DUMI to collect baseline information on dolphins in Pamlico Sound, specifically dolphin abundance and habitat use around the BTs.

#### Assessment of Marine Mammal Impacts from Explosive Ordnances

MCAS Cherry Point plans to use five types of explosive sources during its training exercises: 2.75-inch Rocket High Explosives, 5-inch Rocket High Explosives, 30 mm High Explosives, 40 mm High Explosives, and G911 grenades. The underwater explosions from these weapons would send a shock wave and blast noise through the water, release gaseous by-products, create an oscillating bubble, and cause a plume of water to shoot up from the water surface. The shock wave and blast noise are of most concern to marine animals. In general, potential impacts from explosive detonations can range from brief effects (such as short term behavioral disturbance), tactile perception, physical discomfort, slight injury of the internal organs and the auditory system, to death of the animal (Yelverton et al., 1973; O'Keeffe and Young, 1984; DoN, 2001).



Explosives produce significant acoustic energy across several frequency decades of bandwidth (i.e., broadband). Propagation loss is sufficiently sensitive to frequency as to require model estimates at several frequencies over such a wide band. The effects of an underwater explosion on a marine mammal depend on many factors, including the size, type, and depth of both the animal and the explosive charge; the depth of the water column; and the standoff distance between the charge and the animal, as well as the sound propagation properties of the environment. The net explosive weight (or NEW) of an explosive is the weight of TNT required to produce an equivalent explosive power. The detonation depth of an explosive is particularly important due to a propagation effect known as surface-image interference. For sources located near the sea surface, a distinct interference pattern arises from the coherent sum of the two paths that differ only by a single reflection from the pressure-release surface. As the source depth and/or the source frequency decreases, these two paths increasingly, destructively interfere with each other, reaching total cancellation at the surface (barring surface-reflection scattering loss). Marine Corps conservatively estimates that all explosives would detonate at a 1.2 m (3.9 ft) water depth. This is the worst case scenario as the purpose of training is to hit the target, resulting in an in-air explosion.

The firing sequence for some of the munitions consists of a number of rapid bursts, often lasting a second or less. The maximum firing time is 10-15 second bursts. Due to the tight spacing in time, each burst can be treated as a single detonation. For the energy metrics, the impact area of a burst is computed using a source energy spectrum that is the source spectrum for a single detonation scaled by the number of rounds in a burst. For the pressure metrics, the impact area for a burst is the same as the impact area of a single

round. For all metrics, the cumulative impact area of an event consisting of a certain number of bursts is merely the product of the impact area of a single burst and the number of bursts, as would be the case if the bursts are sufficiently spaced in time or location as to insure that each burst is affecting a different set of marine wildlife.

Physical damage of tissues resulting from a shock wave (from an explosive detonation) is classified as an injury. Blast effects are greatest at the gas-liquid interface (Landsberg, 2000) and gas containing organs, particularly the lungs and gastrointestinal tract, are especially susceptible to damage (Goertner, 1982; Hill 1978; Yelverton et al., 1973). Nasal sacs, larynx, pharynx, trachea, and lungs may be damaged by compression/expansion caused by the oscillations of the blast gas bubble (Reidenberg and Laitman, 2003). Severe damage (from the shock wave) to the ears can include tympanic membrane rupture, fracture of the ossicles, damage to the cochlea, hemorrhage, and cerebrospinal fluid leakage into the middle ear.

Non-lethal injury includes slight injury to internal organs and the auditory system; however, delayed lethality can be a result of individual or cumulative sublethal injuries (DoN, 2001). Immediate lethal injury would be a result of massive combined trauma to internal organs as a direct result of proximity to the point of detonation (DoN, 2001). Exposure to distance explosions could result only in behavioral changes. Masked underwater hearing thresholds in two bottlenose dolphins and one beluga whale have been measured before and after exposure to impulsive underwater sounds with waveforms resembling distant signatures of underwater explosions (Finneran et al., 2000). The authors found no temporary shifts in masked-hearing thresholds, defined as a 6-dB or larger increase in threshold over pre-exposure levels, had been observed at the

highest impulse level generated (500 kg at 1.7 km, peak pressure 70 kPa); however, disruptions of the animals' trained behaviors began to occur at exposures corresponding to 5 kg at 9.3 km and 5 kg at 1.5 km for the dolphins and 500 kg at 1.9 km for the beluga whale.

Generally, the higher the level of impulse and pressure level exposure, the more severe the impact to an individual. While, in general, dolphins could sustain injury or mortality if within very close proximity to in-water explosion, monitoring and mitigation measures employed by the Marine Corps before and during training exercises, as would be required under any Authorization issued, are designed to avoid any firing if a marine mammal is sighted within designated BT zones (see Proposed Mitigation and Monitoring section). No marine mammal injury or death has been attributed to the specified activities described in the application. As such, and due to implementation of the proposed mitigation and monitoring measures, bottlenose dolphin injury, serious injury or mortality is not anticipated nor would any be authorized.

#### Inert Ordnances

The potential risk to marine mammals from non-explosive ordnance entails two possible sources of impacts: elevated sound levels or the ordnance physically hitting an animal. The latter is discussed below in the Munition Presence section. The USMC provided information that the noise fields generated in water by the firing of non-explosive ordnance indicate that the energy radiated is about 1 to 2 percent of the total kinetic energy of the impact. This energy level (and likely peak pressure levels) is well below the TTS-energy threshold, even at 1-m from the impact and is not expected to be

audible to marine mammals. As such, the noise generated by the in-water impact of non-explosive ordnance will not result in take of marine mammals.

### Training Debris

In addition to behavioral and physiological impacts from live fire and ammunition testing, we have preliminarily analyzed impacts from presence of munition debris in the water, as described in the Marine Corps' application and 2009 EA. These impacts include falling debris, ingestion of expended ordnance, and entanglement in parachute debris.

Ingestion of marine debris by marine mammals can cause digestive tract blockages or damage the digestive system (Gorzelay, 1998; Stamper et al., 2006). Debris could be either the expended ordnance or non-munition related products such as chaff and self protection flares. Expended ordnance would be small and sink to the bottom. Chaff is composed of either aluminum foil or aluminum-coated glass fibers designed to act as a visual smoke screen; hiding the aircraft from enemy radar. Chaff also serves as a decoy for radar detection, allowing aircraft to maneuver or egress from the area. The foil type currently used is no longer manufactured, although it remains in the inventory and is used primarily by B-52 bombers. Both types of chaff are cut into dipoles ranging in length from 0.3 to over 2.0 inches. The aluminum foil dipoles are 0.45 mils (0.00045 inches) thick and 6 to 8 mils wide. The glass fiber dipoles are generally 1 mil (25.4 microns) in diameter, including the aluminum coating. Chaff is packed into about 4-ounce bundles. The major components of chaff are silica, aluminum, and stearic acid; all naturally prevalent in the environment.

Based on the dispersion characteristics of chaff, concentrations around the BTs would be low. For example, Hullar et al. (1999) calculated that a 4.97-mile by 7.46-mile area

(37.1 km<sup>2</sup>) would be affected by deployment of a single cartridge containing 150 grams of chaff; however, concentration would only be about 5.4 grams per square nautical mile. This corresponds to fewer than 179,000 fibers per square nautical mile or fewer than 0.005 fibers per square foot.

Self-protection flares are deployed to mislead or confuse heat-sensitive or heat-seeking anti-aircraft systems. The flares are magnesium pellets that, when ignited, burn for a short period of time (less than 10 seconds) at 2,000 degrees Fahrenheit. Air-deployed LUU-2 high-intensity illumination flares are used to illuminate targets, enhancing a pilot's ability to see targets while using Night Vision Goggles. The LUU-2B Flare has a light output rating of  $1.8 \times 10^6$  candlepower and at 1,000 feet altitude illuminates a circle on the ground of 500 meters. The LUU-2 is housed in a pod or canister and is deployed by ejection. The mechanism has a timer on it that deploys the parachute and ignites the flare candle. The flare candle burns magnesium at high temperature, emitting an intense bright white light. The LUU-2 has a burn time of approximately 5 minutes while suspended from a parachute. The pyrotechnic candle consumes the flare housing, reducing flare weight, which in turn slows the rate of fall during the last 2 minutes of burn time. At candle burnout an explosive bolt is fired, releasing one parachute support cable, which causes the parachute to collapse.

Ingestion of debris by dolphins is not likely, as dolphins typically eat fish and other moving prey items. We solicited information on evidence of debris ingestion from two marine mammal veterinarians who have performed many necropsies on the protected species of North Carolina's waters. In their experience, no necropsies of bottlenose dolphins have revealed evidence of munition, parachute, or chaff ingestion (pers. comm.,

Drs. C. Harms and D. Rostein, November 14, 2009). However, it was noted evidence of chaff ingestion would be difficult to detect. In the chance that dolphins do ingest chaff, the filaments are so fine they would likely pass through the digestive system without complication. However, if the chaff is durable enough, it might act as a linear foreign body. In such case, the intestines bunch up on the line restricting movement of the line resulting in an obstruction. The peristalsis on an immovable thin line can cause intestinal lacerations and perforations (pers. comm., C. Harms, November 14, 2009). This is a well-known complication in cats when they ingest thread and which occurs occasionally with sea turtles ingesting fishing line. The longevity of chaff filaments, based upon dispersion rates, is unclear. Chaff exposed to synthetic seawater and aqueous environments in the pH range of 4-10 exhibited varying levels of degradation suggesting a short lifespan for the outer aluminum coating (Farrell and Siciliano, 1998). The underlying filament is a flexible silica core and composed of primarily silica dioxide. While no studies have been conducted to evaluate the effects of chaff ingestion on marine mammals, the effects are expected to be negligible based upon chaff concentration in the environment, size of fibers, and available toxicity data on fiberglass and aluminum. Given that the size of chaff fibers are no more than 2 inches long, tidal flushing reduces concentration in the environment, and chaff degradation rate, the chance of chaff ingestions is unlikely; however, if swallowed, impacts would be negligible.

Given that there is no evidence that dolphins ingest military debris; dolphins in the Sound forage on moving prey suspended in the water column while expended munition would sink; the property and dispersion characteristics of chaff make potential for ingestion discountable; and that Pamlico Sound is a tidal body of water with continuing

flushing, we have preliminarily determined that the presence of training debris would not have an effect on dolphins in Pamlico Sound.

Although sometimes large, expended parachutes (e.g., those from the flares) are flimsy and structurally simple. Thus, we have preliminarily determined that the probability of entanglement with a dolphin is low. There are no known reports of live or stranded dolphins entangled in parachute gear; fishing gear is usually the culprit of reported entanglements. The Service's Marine Mammal Stranding Network (Network) has established protocol for reporting marine mammals in peril. Should any injured, stranded or entangled marine mammal be observed by USMC personnel during training exercises, the sighting would be reported to the Network within 24 hours of the observation.

#### Vessel and Aircraft Presence

The marine mammals most vulnerable to vessel strikes are slow-moving and/or spend extended periods of time at the surface in order to restore oxygen levels within their tissues after deep dives (e.g., right whales, fin whales (Balaenoptera physalus), and sperm whales (Physeter macrocephalus)). Smaller marine mammals such as bottlenose dolphins (the only marine mammal that would be encountered at the BTs) are agile and move more quickly through the water, making them less susceptible to ship strikes. We are not aware of any vessel strikes of bottlenose dolphins in Pamlico Sound during training operations. Therefore, we do not anticipate that Marine Corps vessels engaged in the specified activity would strike any marine mammals and no take from ship strike would be authorized in the proposed Authorization.

Behaviorally, marine mammals may or may not respond to the operation of vessels and associated noise. Responses to vessels vary widely among marine mammals in general, but also among different species of small cetaceans. Responses may include attraction to the vessel (Richardson et al., 1995); altering travel patterns to avoid vessels (Constantine, 2001; Nowacek et al., 2001; Lusseau, 2003, 2006); relocating to other areas (Allen and Read, 2000); cessation of feeding, resting, and social interaction (Baker et al., 1983; Bauer and Herman, 1986; Hall, 1982; Krieger and Wing, 1984; Lusseau, 2003; Constantine et al., 2004); abandoning feeding, resting, and nursing areas (Jurasz and Jurasz 1979; Dean et al., 1985; Glockner-Ferrari and Ferrari 1985, 1990; Lusseau, 2005; Norris et al., 1985; Salden, 1988; Forest, 2001; Morton and Symonds, 2002; Courbis, 2004; Bejder, 2006); stress (Romano et al., 2004); and changes in acoustic behavior (Van Parijs and Corkeron, 2001). However, in some studies marine mammals display no reaction to vessels (Watkins, 1986; Nowacek et al., 2003) and many odontocetes show considerable tolerance to vessel traffic (Richardson et al., 1995). Dolphins may actually reduce the energetic cost of traveling by riding the bow or stern waves of vessels (Williams et al., 1992; Richardson et al., 1995).

Dolphins within Pamlico Sound are continually exposed to recreational, commercial, and military vessels. Richardson et al. (1995) addresses in detail three responses that marine mammals may experience when exposed to anthropogenic activities: tolerance; habituation; and sensitization. More recent publications provide variations on these themes rather than new data (NRC, 2003). Marine mammals are often seen in regions with much human activity; thus, certain individuals or populations exhibit some tolerance of anthropogenic noise and other stimuli. Animals will tolerate a stimulus they might



otherwise avoid if the benefits in terms of feeding, mating, migrating to traditional habitats, or other factors outweigh the negative aspects of the stimulus (NRC, 2003). In many cases, tolerance develops as a result of habituation. The NRC (2003) defines habituation as a gradual waning of behavioral responsiveness over time as animals learn that a repeated or ongoing stimulus lacks significant consequences for the animals. Contrarily, sensitization occurs when an animal links a stimulus with some degree of negative consequence and as a result increases responsiveness to that human activity over time (Richardson et al., 1995). For example, seals and whales are known to avoid previously encountered vessels involved in subsistence hunts (Walker, 1949; Ash, 1962; Terhune, 1985) and bottlenose dolphins that had previously been captured and released from a 7.3 m boat involved in health studies were documented to flee when that boat approached closer than 400 m, whereas dolphins that had not been involved in the capture did not display signs of avoidance of the vessel (Irvine et al., 1981). Because dolphins in Pamlico Sound are continually exposed to vessel traffic that does not present immediate danger to them, it is likely animals are both tolerant and habituated to vessels.

The specified activities also involve aircraft, which marine mammals are known to react (Richardson et al., 1995). Aircraft produce noise at frequencies that are well within the frequency range of cetacean hearing and also produce visual signals such as the aircraft itself and its shadow (Richardson et al., 1995, Richardson & Würsig, 1997). A major difference between aircraft noise and noise caused by other anthropogenic sources is that the sound is generated in the air, transmitted through the water surface and then propagates underwater to the receiver, diminishing the received levels to significantly

below what is heard above the water's surface. Sound transmission from air to water is greatest in a sound cone 26 degrees directly under the aircraft.

Reactions of odontocetes to aircraft have been reported less often than those of pinnipeds. Responses to aircraft include diving, slapping the water with pectoral fins or tail fluke, or swimming away from the track of the aircraft (Richardson et al., 1995). The nature and degree of the response, or the lack thereof, are dependent upon nature of the flight (e.g., type of aircraft, altitude, straight vs. circular flight pattern). Würsig et al. (1998) assessed the responses of cetaceans to aerial surveys in the northcentral and western Gulf of Mexico using a DeHavilland Twin Otter fixed-wing airplane. The plane flew at an altitude of 229 m at 204 km/hr. A minimum of 305 m straight line distance from the cetaceans was maintained. Water depth was 100-1000m. Bottlenose dolphins most commonly responded by diving (48 percent), while 14percent responded by moving away. Other species (e.g., beluga whale (Delphinapterus leucas), sperm whale) show considerable variation in reactions to aircraft but diving or swimming away from the aircraft are the most common reactions to low flights (less than 500 m).

#### Anticipated Effects on Habitat

Detonations of live ordnance would result in temporary modification to water properties. As described above, an underwater explosion from these weapon would send a shock wave and blast noise through the water, release gaseous by-products, create an oscillating bubble, and cause a plume of water to shoot up from the water surface. However, these would be temporary and not expected to last more than a few seconds. Because dolphins are not expected to be in the area during live firing, due to monitoring

and mitigation measure implementation, they would not be subject to any short term habitat alterations.

Similarly, no long term impacts with regard to hazardous constituents are expected to occur. MCAS Cherry Point has an active Range Environmental Vulnerability Assessment (REVA) program in place to monitor impacts to habitat from its activities. One goal of REVA is to determine the horizontal and vertical concentration profiles of heavy metals, explosives constituents, perchlorate nutrients, and dissolved salts in the sediment and seawater surrounding BT-9 and BT-11. The preliminary results of the sampling indicate that explosive constituents (e.g., trinitrotoluene (TNT), cyclotrimethylenetrinitramine (RDX), and hexahydro-trinitro-triazine (HMX), as described in Hazardous Constituents [Subchapter 3.2.7.2] of the MCAS Cherry Point Range Operations EA, were not detected in any sediment or water sample surrounding the BTs. Metals were not present above toxicity screening values. Perchlorate was detected in a few sediment samples above the detection limit (0.21 ppm), but below the reporting limit (0.6 ppm). The ongoing REVA would continue to evaluate potential munitions constituent migration from operational range areas to off-range areas and MCAS Cherry Point.

While it is anticipated that the specified activity may result in marine mammals avoiding certain areas due to temporary ensonification, this impact to habitat and prey resources is temporary and reversible and considered in further detail earlier in this document, as behavioral modification. The main impact associated with the proposed activity would be temporarily elevated noise levels and the associated direct effects on marine mammals, previously discussed in this notice.

## Summary of Previous Monitoring

The Marine Corps complied with the mitigation and monitoring required under the previous authorizations (2010-2012). In accordance with the 2010-11 IHA, USMC submitted a final monitoring report, which described the activities conducted and observations made. USMC did not record observations of any marine mammals during training exercises. The only recorded observations – which were of bottlenose dolphins – were on two occasions by maintenance vessels engaged in target maintenance. No marine mammals were observed during range sweeps, air to ground activities, surface to surface activities (small boats), or ad hoc via range cameras. Table 6 details the number of sorties conducted, by air and water, at each target. The number of sorties conducted does not relate to the total amount of munitions expended, as the training requirements for the specific military unit conducting the sortie determine the munitions loading for the air platform or watercraft during each sortie. In addition, munitions expenditures may be determined by the loading specifications of the specific aircraft and vessels used in the training exercise.

**Table 6** Sorties conducted at BT-9 and BT-11

Mission type	BT-9	BT-11
Air-to-surface	1,554	4,251
Surface-to-surface (water-to-water)	223	105
<b>Total</b>	<b>1,777</b>	<b>4,356</b>

The total amount of ordnance expended at BT-9 and BT-11 under the 2010-11 IHA was 878,625 and 693,612 respectively (Table 7). These amounts represent 98 and 62 percent of the estimated annual maximum ordnance expenditures. The amounts of ordnance expended at the BTs account for all use of the targets. There are five types of explosive sources used at BT-9: 2.75-inc Rocket High Explosives, 5-inch Rocket High Explosives, 30 mm High Explosives, 40 mm High Explosives, and G911 grenades. No

explosive munitions are used at BT-11. Based on this information, the Marine Corps did not exceed the authorized level of take.

**Table 7** Ordnance usage at BT-9

Munitions expenditures	Total rounds		Percentage of maximum	
	BT-9	BT-11	BT-9	BT-11
Small arms, excluding .50 cal	355,718	363,899	68	72
.50 cal	410,815	246,255	160	75
Large arms (Live)	480 (all 40 mm)	N/A	4	N/A
Large arms (Inert)	108,811	79,531	117	33
Rockets (Live)	48 (all 2.75 in)	N/A	20	N/A
Rockets (Inert)	185	2,018	26	44
Bombs/Grenades (Live)	0	N/A	0	N/A
Bombs/Grenades (Inert)	2,086	1,697	51	8
Pyrotechnics	482	212	11	2
<b>Total</b>	<b>878,625</b>	<b>693,612</b>	<b>98</b>	<b>62</b>

The Marine Corps will submit a monitoring report for the 2012 training season which expired on December 31, 2012, to us no later than March 31, 2013.

#### Proposed Mitigation

In order to issue an incidental take authorization under section 101(a)(5)(D) of the MMPA, we must set forth the permissible methods of taking pursuant to such activity, and other means of effecting the least practicable adverse impact on such species or stock and its habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance, and the availability of such species or stock for taking for certain subsistence uses.

The NDAA of 2004 amended the MMPA as it relates to military-readiness activities and the ITA process such that “least practicable adverse impact” shall include consideration of personnel safety, practicality of implementation, and impact on the effectiveness of the military readiness activity. The training activities described in the Marine Corp’s application are considered military readiness activities.

The Marine Corps, in collaboration with us, has worked to identify potential practicable and effective mitigation measures, which include a careful balancing of the likely benefit of any particular measure to the marine mammals with the likely effect of that measure on personnel safety, practicality of implementation, and impact on the "military-readiness activity". These proposed mitigation measures are listed below.

(1) Range Sweeps: The VMR-1 squadron, stationed at MCAS Cherry Point, includes three specially equipped HH-46D helicopters. The primary mission of these aircraft, known as PEDRO, is to provide search and rescue for downed 2<sup>d</sup> Marine Air Wing aircrews. On-board are a pilot, co-pilot, crew chief, search and rescue swimmer, and a medical corpsman. Each crew member has received extensive training in search and rescue techniques, and is therefore particularly capable at spotting objects floating in the water.

PEDRO crew would conduct a range sweep the morning of each exercise day prior to the commencement of range operations. The primary goal of the pre-exercise sweep is to ensure that the target area is clear of fisherman, other personnel, and protected species. The sweep is flown at 100-300 meters above the water surface, at airspeeds between 60-100 knots. The path of the sweep runs down the western side of BT-11, circles around BT-9 and then continues down the eastern side of BT-9 before leaving. The sweep typically takes 20-30 minutes to complete. The PEDRO crew is able to communicate directly with range personnel and can provide immediate notification to range operators. The PEDRO aircraft would remain in the area of a sighting until clear if possible or as mission requirements dictate.

If marine mammals are sighted during a range sweep, sighting data will be collected and entered into the US Marine Corps sighting database, web-interface, or report generator and this information would be relayed to the training Commander. Sighting data includes the following (collected to the best of the observer's ability): (1) species identification; (2) group size; (3) the behavior of marine mammals (e.g., milling, travel, social, foraging); (4) location and relative distance from the BT; (5) date, time and visual conditions (e.g., Beaufort sea state, weather) associated with each observation; (6) direction of travel relative to the BT; and (7) duration of the observation.

(2) Cold Passes: All aircraft participating in an air-to-surface exercise would be required to perform a "cold pass" immediately prior to ordnance delivery at the BTs both day and night. That is, prior to granting a "First Pass Hot" (use of ordnance), pilots would be directed to perform a low, cold (no ordnance delivered) first pass which serves as a visual sweep of the targets prior to ordnance delivery to determine if unauthorized civilian vessels or personnel, or protected species, are present. The cold pass is conducted with the aircraft (helicopter or fixed-winged) flying straight and level at altitudes of 200-3000 feet over the target area. The viewing angle is approximately 15 degrees. A blind spot exists to the immediate rear of the aircraft. Based upon prevailing visibility, a pilot can see more than one mile forward upon approach. The aircrew and range personnel make every attempt to ensure clearance of the area via visual inspection and remotely operated camera operations (see Proposed Monitoring and Reporting section). The Range Controller may deny or approve the First Pass Hot clearance as conditions warrant.

(3) Delay of Exercises: An active range would be considered "fouled" and not available for use if a marine mammal is present within 1000 yards (914 m) of the target

area at BT-9 or anywhere within Rattan Bay (BT-11). Therefore, if a marine mammal is sighted within 1000 yards (914 m) of the target at BT-9 or anywhere within Rattan Bay at BT-11 during the cold pass or from range camera detection, training would be delayed until the marine mammal moves beyond and on a path away from 1000 yards (914 m) from the BT-9 target or out of Rattan Bay at BT-11. This mitigation applies to both air-to-surface and surface-to-surface exercises.

(4) Range Camera Use: To increase the safety of persons or property near the targets, Range Operation and Control personnel monitor the target area through tower mounted safety and surveillance cameras. The remotely operated range cameras are high resolution and, according to range personnel, allow a clear visual of a duck floating near the target. The cameras allow viewers to see animals at the surface and breaking the surface, but not underwater.

A new, enhanced camera system has been purchased and will be installed on BT-11 towers 3 and 7, and on both towers at BT-9. The new camera system has night vision capabilities with resolution levels near those during daytime. Lenses on the camera system have focal lengths of 40 mm to 2200 mm (56x), with view angles of 18° 10' and 13° 41', respectively. The field of view when zoomed in on the Rattan Bay targets will be 23 ft wide by 17 ft high, and on the mouth of Rattan Bay itself 87 ft wide by 66 ft high.

Again, in the event that a marine mammal is sighted within 1000 yards (914 m) of the BT-9 target, or anywhere within Rattan Bay, the target would be declared fouled. Operations may commence in the fouled area after the animal(s) have moved 1000 yards (914 m) from the BT-9 target and/or out of Rattan Bay.



(5) Vessel Operation: All vessels used during training operations would abide by the Service's Southeast Regional Viewing Guidelines designed to prevent harassment to marine mammals (<http://www.nmfs.noaa.gov/pr/education/southeast/>).

(6) Stranding Network Coordination: The USMC would coordinate with the local NMFS Stranding Coordinator for any unusual marine mammal behavior and any stranding, beached live/dead, or floating marine mammals that may occur at any time during training activities or within 24 hours after completion of training.

#### Proposed Monitoring and Reporting

In order to issue an ITA for an activity, section 101(a)(5)(D) of the MMPA states that we must set forth "requirements pertaining to the monitoring and reporting of such taking". The MMPA implementing regulations at 50 CFR 216.104 (a)(13) indicate that requests for IHAs must include the suggested means of accomplishing the necessary monitoring and reporting that will result in increased knowledge of the species and of the level of taking or impacts on populations of marine mammals that are expected to be present.

#### Proposed Monitoring

The Marine Corps proposes to conduct the following to fulfill the necessary monitoring and reporting that would result in increased knowledge of the species and of the level of taking or impacts on populations of marine mammals expected to be present within the action area:

(1) Protected Species Observer Training: Pilots, operators of small boats, and other personnel monitoring for marine mammals would be required to take the Marine Species Awareness Training (Version 2), maintained and promoted by the Department of the

Navy. This training would make personnel knowledgeable of marine mammals, protected species, and visual cues related to the presence of marine mammals and protected species.

(2) Weekly and Post-Exercise Monitoring: Post-exercise monitoring would be conducted concomitant to the next regularly scheduled pre-exercise sweep. Weekly monitoring events would include a maximum of five pre-exercise and four post-exercise sweeps. The maximum number of days that would elapse between pre- and post-exercise monitoring events would be approximately three days, and would normally occur on weekends. If marine mammals are observed during this monitoring, sighting data identical to those collected by PEDRO crew would be recorded.

(3) Long-term Monitoring: The Marine Corps has awarded DUMML duties to obtain abundance, group dynamics (e.g., group size, age census), behavior, habitat use, and acoustic data on the bottlenose dolphins which inhabit Pamlico Sound, specifically those around BT-9 and BT-11. DUMML began conducting boat-based surveys and passive acoustic monitoring of bottlenose dolphins in Pamlico Sound in 2000 (Read *et al.*, 2003) and specifically at BT-9 and BT-11 in 2003 (Mayer, 2003). To date, boat-based surveys indicate that bottlenose dolphins may be resident to Pamlico Sound and use BT restricted areas on a frequent basis. Passive acoustic monitoring (PAM) is providing more detailed insight into how dolphins use the two ranges, by monitoring for their vocalizations year-round, regardless of weather conditions or darkness. In addition to these surveys, DUMML scientists are testing a real-time passive acoustic monitoring system at BT-9 that will allow automated detection of bottlenose dolphin whistles, providing yet another method of detecting dolphins prior to training operations. Although it is unlikely this PAM

system would be active for purposes of implementing mitigation measures before an exercise prior to expiration of the proposed Authorization, it could be operational for future MMPA incidental take authorizations and would be evaluated for effectiveness at the appropriate time.

(4) Reporting: The Marine Corps would submit a report to us within 90 days after expiration of the Authorization or, if a subsequent incidental take authorization is requested, within 120 days prior to expiration of the Authorization. The report would summarize the type and amount of training exercises conducted, all marine mammal observations made during monitoring, and if mitigation measures were implemented. The report would also address the effectiveness of the monitoring plan in detecting marine mammals.

#### General Notification of Injured or Dead Marine Mammals

The Marine Corps would systematically observe training operations for injured or disabled marine mammals. In addition, the Marine Corps would monitor the principal marine mammal stranding networks and other media to correlate analysis of any dolphin strandings that could potentially be associated with MCAS Cherry Point training operations.

Marine Corps personnel would ensure that we are notified immediately or as soon as clearance procedures allow if an injured, stranded, or dead marine mammal is found during or shortly after, and in the vicinity of, any training operations. The Marine Corps would provide us with species or description of the animal(s), the condition of the animal(s) (including carcass condition if the animal is dead), location, time of first discovery, observed behaviors (if alive), and photo or video (if available).

In the event that an injured, stranded, or dead marine mammal is found by Marine Corps personnel that is not in the vicinity of, or found during or shortly after operations, the Marine Corps personnel would report the same information as listed above as soon as operationally feasible and clearance procedures allow.

#### General Notification of a Ship Strike

In the event of a vessel strike, at any time or place, the Marine Corps shall do the following:

- Immediately report to us the species identification (if known), location (lat/long) of the animal (or the strike if the animal has disappeared), and whether the animal is alive or dead (or unknown);
- Report to us as soon as operationally feasible the size and length of the animal, an estimate of the injury status (e.g., dead, injured but alive, injured and moving, unknown, etc.), vessel class/type and operational status;
- Report to us the vessel length, speed, and heading as soon as feasible; and
- Provide us a photo or video, if equipment is available.

#### Estimated Take by Incidental Harassment

The following provides the Marine Corps' model for take of dolphins from explosives (without consideration of mitigation and the conservative assumption that all explosives would land in the water and not on the targets or land) and potential for direct hits and our analysis of potential harassment from small vessel and aircraft operations.

#### Acoustic Take Criteria

For the purposes of an MMPA incidental take authorization, three levels of take are identified: Level B harassment; Level A harassment; and mortality (or serious injury

leading to mortality). The categories of marine mammal responses (physiological and behavioral) that fall into harassment categories were described previously in this notice. A method to estimate the number of individuals that will be taken, pursuant to the MMPA, based on the proposed action has been derived. To this end, we use acoustic criteria that estimate at what received level Level B harassment, Level A harassment, and mortality (or serious injury) of marine mammals would occur. The acoustic criteria for underwater detonations are comprehensively explained in our proposed and final rulemakings for the U.S. Navy's Cherry Point Range Operations (74 FR 11057; 74 FR 28370). We summarize them here:

Criteria and thresholds for estimating the exposures from a single explosive activity on marine mammals were established for the Seawolf Submarine Shock Test Final Environmental Impact Statement (FEIS) ("Seawolf") and subsequently used in the USS Winston S. Churchill (DDG 81) Ship Shock FEIS ("Churchill") (DoN, 1998 and 2001). We adopted these criteria and thresholds in final rule on the unintentional taking of marine animals occurring incidental to the shock testing which involved large explosives (65 FR 77546; December 12, 2000). Because no large explosives (greater than 1000 lbs NEW) would be used at Cherry Point during the specified activities, a revised acoustic criterion for small underwater explosions (i.e., 23 pounds per square inch [psi] instead of previous acoustic criteria of 12 psi for peak pressure over all exposures) has been established to predict onset of TTS.

#### I.1. Thresholds and Criteria for Injurious Physiological Impacts

##### I.1.a. Single Explosion

For injury, NMFS uses dual criteria, eardrum rupture (i.e. tympanic-membrane injury) and onset of slight lung injury, to indicate the onset of injury. The threshold for tympanic-membrane (TM) rupture corresponds to a 50 percent rate of rupture (i.e., 50 percent of animals exposed to the level are expected to suffer TM rupture). This value is stated in terms of an Energy Flux Density Level (EL) value of 1.17 inch pounds per square inch (in-lb/in<sup>2</sup>), approximately 205 dB re 1 microPa<sup>2</sup>- sec.

The threshold for onset of slight lung injury is calculated for a small animal (a dolphin calf weighing 26.9 lbs), and is given in terms of the “Goertner modified positive impulse,” indexed to 13 psi-msec (DoN, 2001). This threshold is conservative since the positive impulse needed to cause injury is proportional to animal mass, and therefore, larger animals require a higher impulse to cause the onset of injury. This analysis assumed the marine species populations were 100 percent small animals. The criterion with the largest potential impact range (most conservative), either TM rupture (energy threshold) or onset of slight lung injury (peak pressure), will be used in the analysis to determine Level A exposures for single explosive events.

For mortality and serious injury, we use the criterion corresponding to the onset of extensive lung injury. This is conservative in that it corresponds to a 1 percent chance of mortal injury, and yet any animal experiencing onset severe lung injury is counted as a lethal exposure. For small animals, the threshold is given in terms of the Goertner modified positive impulse, indexed to 30.5 psi-msec. Since the Goertner approach depends on propagation, source/animal depths, and animal mass in a complex way, the actual impulse value corresponding to the 30.5 psi-msec index is a complicated

calculation. To be conservative, the analysis used the mass of a calf dolphin (at 26.9 lbs) for 100 percent of the populations.

#### I.1.b. Multiple Explosions

For multiple explosions, the Churchill approach had to be extended to cover multiple sound events at the same training site. For multiple exposures, accumulated energy over the entire training time is the natural extension for energy thresholds since energy accumulates with each subsequent shot (detonation); this is consistent with the treatment of multiple arrivals in Churchill. For positive impulse, it is consistent with the Churchill final rule to use the maximum value over all impulses received.

#### I.2. Thresholds and Criteria for Non-Injurious Physiological Effects

To determine the onset of TTS (non-injurious harassment) — a slight, recoverable loss of hearing sensitivity, there are dual criteria: an energy threshold and a peak pressure threshold. The criterion with the largest potential impact range (most conservative), either the energy or peak pressure threshold, will be used in the analysis to determine Level B TTS exposures. We refer the reader to the following sections for descriptions of the thresholds for each criterion.

##### I.2.a. Single Explosion –TTS-Energy Threshold

The TTS energy threshold for explosives is derived from the Space and Naval Warfare Systems Center (SSC) pure-tone tests for TTS (Schlundt et al., 2000; Finneran and Schlundt, 2004). The pure-tone threshold (192 dB as the lowest value) is modified for explosives by (a) interpreting it as an energy metric, (b) reducing it by 10 dB to account for the time constant of the mammal ear, and (c) measuring the energy in 1/3-

octave bands, the natural filter band of the ear. The resulting threshold is 182 dB re 1 microPa<sup>2</sup>-sec in any 1/3-octave band.

#### I.2.b. Single Explosion –TTS-Peak Pressure Threshold

The second threshold applies to all species and is stated in terms of peak pressure at 23 psi (about 225 dB re 1 µPa). This criterion was adopted for Precision Strike Weapons (PSW) Testing and Training by Eglin Air Force Base in the Gulf of Mexico (NMFS, 2005). It is important to note that for small shots near the surface (such as in this analysis), the 23-psi peak pressure threshold generally will produce longer impact ranges than the 182-dB energy metric. Furthermore, it is not unusual for the TTS impact range for the 23-psi pressure metric to actually exceed the without-TTS (behavioral change without onset of TTS) impact range for the 177-dB energy metric.

### I.3. Thresholds and Criteria for Behavioral Effects

#### I.3.a. Single Explosion

For a single explosion, to be consistent with Churchill, TTS is the criterion for Level B harassment. In other words, because behavioral disturbance for a single explosion is likely to be limited to a short-lived startle reaction, use of the TTS criterion is considered sufficient protection and therefore behavioral effects (Level B behavioral harassment without onset of TTS) are not expected for single explosions.

#### I.3.b. Multiple Explosions—Without TTS

For multiple explosions, the Churchill approach had to be extended to cover multiple sound events at the same training site. For multiple exposures, accumulated energy over the entire uninterrupted firing time is the natural extension for energy thresholds since energy accumulates with each subsequent shot (detonation); this is consistent with the



treatment of multiple arrivals in Churchill. Because multiple explosions could occur within a discrete time period, a new acoustic criterion-behavioral disturbance without TTS is used to account for behavioral effects significant enough to be judged as harassment, but occurring at lower noise levels than those that may cause TTS.

The threshold is based on test results published in Schlundt et al. (2000), with derivation following the approach of the Churchill FEIS for the energy-based TTS threshold. The original Schlundt et al. (2000) data and the report of Finneran and Schlundt (2004) are the basis for thresholds for behavioral disturbance without TTS. During this study, instances of altered behavior sometimes began at lower exposures than those causing TTS; however, there were many instances when subjects exhibited no altered behavior at levels above the onset-TTS levels. Regardless of reactions at higher or lower levels, all instances of altered behavior were included in the statistical summary. The behavioral disturbance without TTS threshold for tones is derived from the SSC tests, and is found to be 5 dB below the threshold for TTS, or 177 dB re 1 microPa<sup>2</sup>-sec maximum energy flux density level in any 1/3-octave band at frequencies above 100 Hz for cetaceans.

## II. Summary of Thresholds and Criteria for Impulsive Sounds

The effects, criteria, and thresholds used in the assessment for impulsive sounds are summarized in Table 8. The criteria for behavioral effects without physiological effects used in this analysis are based on use of multiple explosives from live, explosive firing at BT-9 only; no live firing occurs at BT-11.

**Table 8** Effects, Criteria, and Thresholds for Impulsive Sounds.

Effect	Criteria	Metric	Threshold	Effect
Mortality	Onset of Extensive Lung Injury	Goertner modified positive impulse	indexed to 30.5 psi-msec (assumes 100 percent small animal at 26.9 lbs)	Mortality
Injurious Physiological	50percent Tympanic Membrane Rupture	Energy flux density	1.17 in-lb/in <sup>2</sup> (about 205 dB re 1 microPa <sup>2</sup> -sec)	Level A
Injurious Physiological	Onset Slight Lung Injury	Goertner modified positive impulse	indexed to 13 psi-msec (assumes 100 percent small animal at 26.9 lbs)	Level A
Non-injurious Physiological	TTS	Greatest energy flux density level in any 1/3-octave band (> 100 Hz for toothed whales and > 10 Hz for baleen whales) - for total energy over all exposures	182 dB re 1 microPa <sup>2</sup> -sec	Level B
Non-injurious Physiological	TTS	Peak pressure over all exposures	23 psi	Level B
Non-injurious Behavioral	Multiple Explosions Without TTS	Greatest energy flux density level in any 1/3-octave (> 100 Hz for toothed whales and > 10 Hz for baleen whales) - for total energy over all exposures (multiple explosions only)	177 dB re 1 microPa <sup>2</sup> -sec	Level B

### Take from Explosives

The Marine Corps conservatively modeled that all explosives would detonate at a 1.2 m (3.9 ft) water depth despite the training goal of hitting the target, resulting in an above water or on land explosion. For sources that are detonated at shallow depths, it is frequently the case that the explosion may breach the surface with some of the acoustic energy escaping the water column. The source levels presented in the table above have not been adjusted for possible venting nor does the subsequent analysis take this into account. Properties of explosive sources used at BT-9, including NEW, peak one-third-octave (OTO) source level, the approximate frequency at which the peak occurs, and

rounds per burst are described in Table 9. Refer to Table 10 for distances to our harassment threshold levels from these sources.

**Table 9** Source Weights and Peak Source Levels.

Source Type	NEW	Peak OTO SL	Frequency of Peak OTO SL	Rounds per Burst
2.75-inch Rocket	4.8 lbs	223.9 dB re: 1µPa	~ 1500 Hertz (Hz)	1
5-inch Rocket	15.0 lbs	228.9 dB re: 1µPa	~ 1000 Hz	1
30 mm	0.1019 lbs	212.1 dB re: 1µPa	~ 2500 Hz	30
40 mm	0.1199 lbs	227.8 dB re: 1µPa	~ 1100 Hz	5
G911 Grenade	0.5	213.9 dB re: 1 µPa	~ 2500 Hz	1

**Table 10** Distances to our harassment thresholds from explosive ordnances.

	Behavioral Disturbance (177 dB Energy)	TTS (23 psi)	Level A (13 psi-msec)	Mortality (31 psi-ms)
2.75-inch Rocket HE	N/A	172 m (564 ft)	47 m (154 ft)	27 m (89 ft)
5" Rocket HE	N/A	255 m (837 ft)	61 m (200 ft)	39 m (128 ft)
30mm HE	209 m (686 ft)	N/A	10 m (33 ft)	5 m (16 ft)
40mm HE	144 m (472 ft)	N/A	10 m (33 ft)	5 m (16 ft)
G911 Grenade	N/A	83 m (272 ft)	21 m (33 ft)	10 m (33 ft)

To calculate take, the distances to which animals may be harassed were considered along with dolphin density. The density estimate from Read *et al.* (2003) was used to calculate take from munitions firing. As described in the Description of Marine Mammals in the Area of the Specified Activity section, this density, 0.183/km<sup>2</sup>, was derived from boat based surveys in 2000 which covered all inland North Carolina waters. Note that estimated density of dolphins at BT-9 and BT-11, specifically, were calculated to be 0.11 dolphins/km<sup>2</sup>, and 1.23 dolphins/km<sup>2</sup> respectively (Maher 2003), based on boat surveys conducted from July 2002 through June 2003 (excluding April, May, Sept. and Jan.).

However, the USMC chose to estimate take of dolphins based on the higher density reported from the summer 2000 surveys (0.183/ km<sup>2</sup>). Additionally, take calculations for munition firing are based on 100 percent water detonation, although the goal of training is to hit the targets, and no pre-exercise monitoring or mitigation. Therefore, take estimates can be considered conservative.

Based on dolphin density and amount of munitions expended, there is very low potential for Level A harassment, serious injury, and mortality and monitoring and mitigation measures are anticipated to further negate this potential. Accordingly, we are not proposing to issue these levels of take. As portrayed in Table 9, the largest harassment zone (Level B) is within 209 m of a detonation in water; however, the Marine Corps has implemented a 1,000 m “foul” zone for BT-9 and anywhere within Raritan Bay for BT-11. In total, from firing of explosive ordnances, the USMC is requesting, and NMFS is proposing to issue, the incidental take of 25 bottlenose dolphins from Level B harassment (Table 11).

**Table 11** Number of dolphins potentially taken from exposure to explosives based on threshold criteria.

<b>Ordnance Type</b>	<b>Level B- Behavioral (177dB re 1microPa<sup>2</sup>-s)</b>	<b>Level B- TTS (23 psi)</b>	<b>Level A- Injurious (205 dB re 1microPa<sup>2</sup>-s or 13 psi)</b>	<b>Mortality (30.5 psi)</b>
2.75" Rocket HE	N/A	4.97	0.17	0.06
5" Rocket HE	N/A	3.39	0.09	0.03
30mm HE	2.55	N/A	0.05	0.00
40mm HE	12.60	N/A	0.16	0.01
G911 Grenade	N/A	0.87	0.03	0.01
Total	15.15	9.23	0.5	0.11

#### Take from Direct Hit

The potential risk of a direct hit to an animal in the target area is estimated to be so low it is discountable. A Range Air Installation Compatible Use Zone (RAICUZ) study generated the surface area or footprints of weapon impact areas associated with air-to-ground ordnance delivery (USMC 2001). Statistically, a weapon safety footprint describes the area needed to contain 99.99 percent of initial and ricochet impacts at the 95-percent confidence interval for each type of aircraft and ordnance utilized on the BTs. At both BT-9 and BT-11 the probability of deployed ordnance landing in the impact footprint is essentially 1.0, since the footprints were designed to contain 99.99 percent of impacts, including ricochets. However, only 36 percent of the weapon footprint for BT-11 is over water in Rattan Bay, so the likelihood of a weapon striking an animal at the BT in Rattan Bay is 64 percent less. Water depths in Rattan Bay range from 3 m (10 ft) in the deepest part of the bay to 0.5 m (1.6 m) close to shore, so that nearly the entire habitat in Rattan Bay is suitable for marine mammal use (or 36 percent of the weapon footprint).

The estimated potential risk of a direct hit to an animal in the target area is extremely low. The probability of hitting a bottlenose dolphin at the BTs can be derived as follows:

Probability = dolphin's dorsal surface area \* density of dolphins. The estimated dorsal surface area of a bottlenose dolphin is 1.425 m<sup>2</sup> (or the average length of 2.85 m times the average body width of 0.5 m). Thus, using Read et al. (2003)'s density estimate of 0.183 dolphins/km<sup>2</sup>, without consideration of mitigation and monitoring implementation, the probability of a dolphin being hit in the waters of BT-9 is  $2.61 \times 10^{-7}$  and of BT-11 is  $9.4 \times 10^{-8}$ . Using the proposed levels of ordnance expenditures at each in-water BT (Tables 4 and 5) and taking into account that only 36 percent of the ordnance deployed at BT-11 is over water, as described in the application, the estimated potential number of ordnance strikes on a marine mammal per year is 0.263 at BT-9 and 0.034 at BT-11. It would take approximately three years of ordnance deployment at the BTs before it would be likely or probable that one bottlenose dolphin would be struck by deployed inert ordnance. Again, these estimates are without consideration to proposed monitoring and mitigation measures.

#### Take from Vessel and Aircraft Presence

Vessel movement is associated with surface-to-surface exercises, as described in the Specified Activities section above, which primarily occurs within BT-11. The USMC is not requesting takes specific to the act of maneuvering small boats within the BTs; however, NMFS has analyzed the potential for take from this activity.

The potential impacts from exposure to vessels are described in the Vessel and Aircraft Presence section above. Interactions with vessels are not a new experience for bottlenose dolphins in Pamlico Sound. Pamlico Sound is heavily used by recreational, commercial (fishing, daily ferry service, tugs, etc.), and military (including the Navy, Air Force, and Coast Guard) vessels year-round. The NMFS' Southeast Regional Office has

developed marine mammal viewing guidelines to educate the public on how to responsibly view marine mammals in the wild and avoid causing a take (<http://www.nmfs.noaa.gov/pr/education/southeast>). The guidelines recommend that vessels should remain a minimum of 50 yards from a dolphin, operate vessels in a predictable manner, avoid excessive speed or sudden changes in speed or direction in the vicinity of animals, and not to pursue, chase, or separate a group of animals. The Marine Corps would abide by these guidelines to the fullest extent practicable. The Marine Corps would not engage in high speed exercises should a marine mammal be detected within the immediate area of the BTs prior to training commencement and would never closely approach, chase, or pursue dolphins. Detection of marine mammals would be facilitated by personnel monitoring on the vessels and those marking success rate of target hits and monitoring of remote camera on the BTs (see Proposed Monitoring and Reporting section).

Based on the description of the action, the other activities regularly occurring in the area, the species that may be exposed to the activity and their observed behaviors in the presence of vessel traffic, and the implementation of measures to avoid vessel strikes, we determined that it is unlikely that the operation of vessels during surface-to-surface maneuvers will result in the take of any marine mammals, in the form of either behavioral harassment, injury, serious injury, or mortality.

Aircraft would move swiftly through the area and would typically fly approximately 914 m from the water's surface before dropping unguided munitions and above 4,572 m for precision-guided munitions bombing. While the aircraft may approach as low as 152 m (500 ft) to drop a bomb this is not the norm and would never been done around marine

mammals. Regional whale watching guidelines advise aircraft to maintain a minimum altitude of 300 m (1,000 ft) above all marine mammals, including small odontocetes, and to not circle or hover over the animals to avoid harassment. Our approach regulations limit aircraft from flying below 300 m (1,000 ft) over a humpback whale (Megaptera novaeangliae) in Hawaii, a known calving ground, and limit aircraft from flying over North Atlantic right whales closer than 460 m (1509 ft). Given that Marine Corps aircraft would not fly below 300 m on the approach, would not engage in hovering or circling the animals, and would not drop to the minimal altitude of 152 m if a marine mammal is in the area, we believe it unlikely that the operation of aircraft, as described above, will result in take of bottlenose dolphins in Pamlico Sound in any manner.

#### Negligible Impact Analysis and Preliminary Determination

Except with respect to certain activities not pertinent here, the MMPA defines "harassment" as: any act of pursuit, torment, or annoyance which (i) has the potential to injure a marine mammal or marine mammal stock in the wild [Level A harassment]; or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering [Level B harassment].

The NDAA's definition of harassment as it applies to a military readiness activity is: (i) any act that injures or has the significant potential to injure a marine mammal or marine mammal stock in the wild [Level A Harassment]; or (ii) any act that disturbs or is likely to disturb a marine mammal or marine mammal stock in the wild by causing disruption of natural behavioral patterns, including, but not limited to, migration,



surfacing, nursing, breeding, feeding, or sheltering, to a point where such behavioral patterns are abandoned or significantly altered [Level B Harassment].

We propose to authorize take by Level B harassment for the proposed training operations. Acoustic stimuli generated during training operations may have the potential to result in the behavioral disturbance of some marine mammals. There is no evidence that planned activities could result in injury, serious injury, or mortality within the specified geographic area for the requested authorization. The required mitigation and monitoring measures would minimize any potential risk for serious injury or mortality.

Pursuant to our regulations implementing the MMPA, an applicant is required to estimate the number of animals that will be “taken” by the specified activities (i.e., takes by harassment only, or takes by harassment, injury, and/or death). This estimate informs the analysis that we must perform to determine whether the activity will have a “negligible impact” on the species or stock. We have defined “negligible impact” in 50 CFR 216.103 as: “an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival.” A negligible impact finding is based on the lack of likely adverse effects on annual rates of recruitment or survival (i.e., population-level effects). An estimate of the number and manner of takes, alone, is not enough information on which to base a negligible impact determination. We must also consider other factors, such as the likely nature of any responses (their intensity, duration, etc.), the context of any responses (critical reproductive time or location, migration, etc.), or any of the other variables mentioned in the first paragraph (if

known), as well as the number and nature of estimated Level A takes, the number of estimated mortalities, and effects on habitat.

The Marine Corps has been conducting gunnery and bombing training exercises at BT-9 and BT-11 for several years and, to date, no dolphin injury, serious injury, or mortality has been attributed these military training exercises. The Marine Corps has a history of notifying the NMFS stranding network when any injured or stranded animal comes ashore or is spotted by personnel on the water. Therefore, stranded animals have been examined by stranding responders, further confirming that it is unlikely training contributes to marine mammal injuries or deaths. Due to the implementation of the aforementioned proposed mitigation measures, no take by Level A harassment or serious injury or mortality is anticipated nor would any be authorized in the IHA. We are proposing; however, to authorize 25 Level B harassment takes associated with training exercises.

The Marine Corps has proposed a 1000 yard (914 m) safety zone around BT-9 despite the fact that the distance to NMFS explosive Level B harassment threshold is 228 yards (209 m). They also would consider an area fouled if any dolphins are spotted within Raritan Bay (where BT-11 is located). The Level B harassment takes allowed for in the IHA would be of very low intensity and would likely result in dolphins being temporarily behaviorally affected by bombing or gunnery exercises. In addition, takes may be attributed to animals not using the area when exercises are occurring; however, this is difficult to calculate. Instead, we look if the specified activities occur during and within habitat important to vital life functions to better inform its negligible impact determination.

Read et al. (2003) concluded that dolphins rarely occur in open waters in the middle of North Carolina sounds and large estuaries, but instead are concentrated in shallow water habitats along shorelines. However, no specific areas have been identified as vital reproduction or foraging habitat. Scientific boat based surveys conducted throughout Pamlico Sound conclude that dolphins use the areas around the BTs more frequently than other portions of Pamlico Sound (Maher, 2003) despite the Marine Corps actively training in a manner identical to the specified activities described here for years.

As described in the Affected Species section of this notice, bottlenose dolphin stock segregation is complex with stocks overlapping throughout the coastal and estuarine waters of North Carolina. It is not possible for the Marine Corps to determine to which stock any individual dolphin taken during training activities belong as this can only be accomplished through genetic testing. However, it is likely that many of the dolphins encountered would belong to the NNCE or SNCE stock. These stocks have a population estimate of 1,387 and 2,454, respectively. We are proposing to authorize 25 takes of bottlenose dolphins in total; therefore, this number represents 1.8 and 1.0 percent, respectively, of those populations. This species is not listed as threatened or endangered under the ESA

Based on the analysis contained herein of the likely effects of the specified activity on marine mammals and their habitat, and taking into consideration the implementation of the mitigation and monitoring measures, we preliminarily find that the specified USMC AS Cherry Point BT-9 and BT-11 training activities will result in the incidental take of marine mammals, by Level B harassment only, and that the total taking from will have a negligible impact on the affected species or stocks.

## Subsistence Harvest of Marine Mammals

Marine mammals are not taken for subsistence uses within Pamlico Sound; therefore, issuance of an IHA to the USMC for MCAS Cherry Point training exercises would not have an unmitigable adverse impact on the availability of the affected species or stocks for subsistence use.

## Endangered Species Act (ESA)

No ESA-listed marine mammals are known to occur within the action area. Therefore, there is no requirement for NMFS to consult under Section 7 of the ESA on the issuance of an Authorization under section 101(a)(5)(D) of the MMPA. However, ESA-listed sea turtles may be present within the action area.

On September 27, 2002, NMFS issued a Biological Opinion (BiOp) on Ongoing Ordnance Delivery at Bombing Target 9 (BT-9) and Bombing Target 11 (BT-11) at Marine Corps Air Station, Cherry Point, North Carolina. The BiOp, which is still in effect, concluded that the USMC's proposed action will not result in adverse impacts to any ESA-listed marine mammals and is not likely to jeopardize the continued existence of the endangered green turtle (Chelonia mydas), leatherback turtle (Dermochelys coriacea), Kemp's ridley turtle (Lepidochelys kempii), or threatened loggerhead turtle (Caretta caretta). The proposed IHA will not result in effects beyond those considered in the 2002 BiOp and NMFS does not anticipate the need for further Section 7 consultation for the Authorization or the underlying activities proposed by the Marines. No critical habitat has been designated for these species in the action area; therefore, none will be affected.

National Environmental Policy Act (NEPA)

On February 11, 2009, the Marine Corps issued a Finding of No Significant Impact for its Environmental Assessment (EA) on MCAS Cherry Point Range Operations. Based on the analysis of the EA, the Marine Corps determined that the proposed action will not have a significant impact on the human environment. We adopted the Marine Corps' EA and signed a Finding of No Significant Impact on August 31, 2010. We have again reviewed the proposed application and preliminarily determined that there are no substantial changes to the proposed action or new environmental impacts or concerns. Therefore, we have determined that a new or supplemental EA or Environmental Impact Statement is likely unnecessary. Before making a final determination in this regard, we will review public comments and information submitted by the public and others in response to this notice. The EA referenced above is available for review at <http://www.nmfs.noaa.gov/pr/permits/incidental.htm>.

Dated: March 26, 2013.

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Helen M. Golde,  
Acting Director,  
Office of Protected Resources,  
National Marine Fisheries Service.

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